Engineering News, October 5, 1961

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ENGINEERING NEWS

No. 1 October 5, 1961

THE NEWSPAPER OF INDUSTRY • A HEYWOOD PUBLICATION

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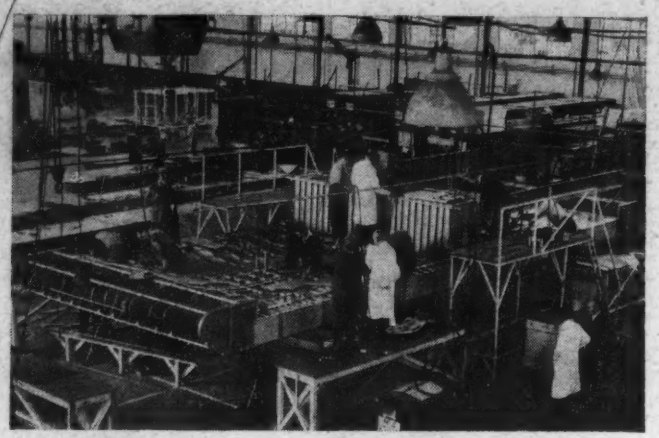
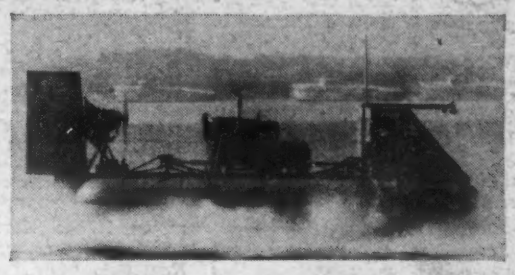


Right: VA1 in action

Left: Building VA3



Britain pushes ahead with new hovercraft

BRITAIN'S lead in the hovercraft field is being further exploited by developments at Vickers Armstrong (South Marston) Ltd. This week's trials of the VA-1 research craft proved its manoeuvrability and the results are being incorporated in the smaller VA-2 now under construction. This will be used for promoting sales, its size permitting world wide air transportation.

The VA-2 has sales potential as a fast executive vehicle carrying four or five people over inaccessible terrain.

A further development now building is the ten-ton VA-3. This can carry 24 passengers plus crew, or a 4,000 lb. load plus crew. Fitted with Blackburn Turmo-turbine engines, the VA-3 will cruise at 70 m.p.h. and operate over waves up to 2ft. high.

A scheme for a ferry boat of about 100 tons has been drawn up. With a hoverheight of 3ft. and a speed of 70 to 80 m.p.h. the payload plus fuel is 49 tons.

The design of bows and sidewalls permits negotiation of floating debris, making the VA-4 ideal for frequent high-speed service on more sheltered seas.

Research into producing craft up to 1,000 tons is proceeding. Such sizes are dictated by two main factors.

First, open-water operation in all weathers requires larger craft with greater hoverheight. This keeps structural loads and its power needs to a minimum.

Second, the relationship of cushion area to perimeter governs the economy of operation.

Design investigation is also under way for servo-actuated mechanical devices to cushion impacts.

These would limit the penalties of making structures resistant to impact loads and remove the need for higher powered lift systems to give more clearance.

When these problems are solved the hovercraft can play a great part in the growing demands of international travel and trade.

Make certain you get your own

ENGINEERING NEWS

every Thursday by completing the coupon on Page 27 TODAY

FERRANTI DRILL AIDS COMPUTERS

A FULLY automatic printed-circuit drilling machine, specifically designed for fast and economical drilling of component fixing holes in printed-circuit boards, has now been introduced by Ferranti Ltd., and will shortly be coming onto the market.

As the size and capacity of transistorized digital computers continues to increase, production engineers are becoming increasingly aware of the need to find shortcuts in producing the large numbers of printed-circuit boards required for these machines.

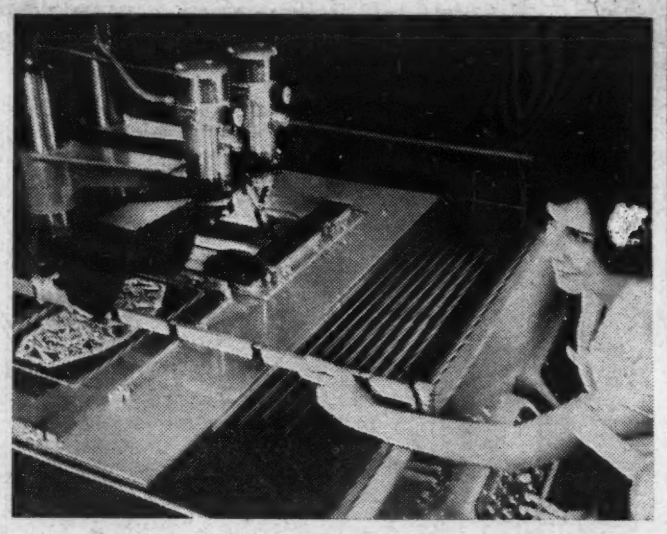
Quantity production

The printed circuit drill has been developed with quantity production in mind and is already being used successfully for drilling the hundreds of printed-circuit boards required for the company's Atlas high-speed computer, and Argus process control computer.

Basically, the machine consists of two drilling heads allowing either tandem or single spindle working; a hydraulically-operated co-ordinate table carrying the printed-circuit boards which is automatically moved to bring the board hole centres in turn below the drills; and a control system for the drilling action and table movement which enables the machine to work unattended except for loading and unloading.

The 20in. by 14in. drilling table is moved parallel with or at

● continued on page 28



Ferranti automatic drilling machine at work on a printed-circuit board. The machine will soon be available.

Cars may soon have hydraulic batteries

INEXPENSIVE hydraulic accumulators may soon replace the lead-acid battery on motor vehicles which require power for operating steering, windows, brakes, or seats. The Ideal Roller and Manufacturing Co. are making a Hycar synthetic rubber bladder, which is fitted inside a metal container.

The bladder contains air or nitrogen under pressure which can vary from a few pounds per sq. in. to 3,000 p.s.i.

Twice Gas-Pressure

A simple pump forces the working fluid into the space between the bladder and the container, and it is normally stored at double the pressure of the gas.

The last drop of fluid can be exhausted from the accumulator at half the maximum pressure—i.e., the pressure of gas in the bladder.

'SUPPLY DATES ARE OVER-OPTIMISTIC'

MAINTAINING delivery promises is still a major problem and most suppliers are super-optimists on the subject of delivery dates.

This was the view taken by Dr. E. N. Hague, purchasing manager of the Shell Petroleum Company, at last week's annual conference in Brighton of the Purchasing Officers' Association.

American suppliers had a consistently better record.

Suppliers, thought by Dr. Hague to be super-optimists on delivery promises, almost invariably erred on the side of over-optimism when dealing with a new line of goods or a new product.

Since snags almost always arise, Dr. Hague advised buyers to allow substantial safety margins in estimating delivery times.

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The world's FIRST engineering newspaper

TODAY'S publication of Engineering News makes industrial history. For the first time engineers have in their hands a newspaper devoted entirely to their interests.

Week by week, in bright, modern newspaper format, it will bring them all the latest news of the industry.

Staffed by a large editorial team of engineers of wide experience, and assisted by specialist contributors, Engineering News is proud to describe itself as produced by engineers for engineers.

All who are engaged in engineering or the allied industries will find here full details of new products and designs, new materials and components, new machinery and techniques.

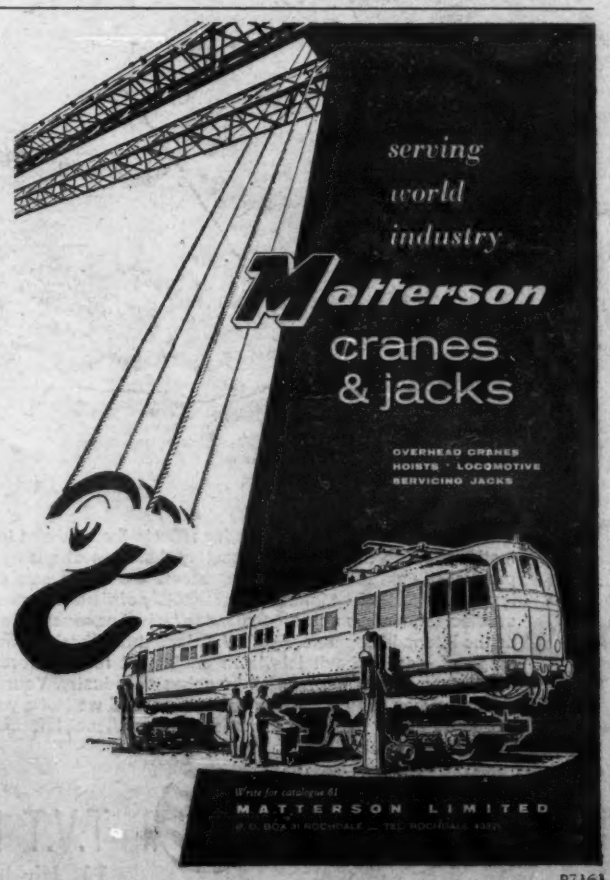
★

Commercial and financial news will be strongly featured with comment by City experts.

Exclusive reports will be a feature of Engineering News, including a wide range of home and foreign news.

Important services now introduced include a Reader Enquiry Department to supply further information about new materials components and equipment.

With its clear concise reporting and its authoritative comment, Engineering News will rapidly be recognised as an essential medium for readers and advertisers alike in this vast and expanding industry.



PEOPLE in the NEWS

FIRTH CLEVELAND TOOLS HAS NEW MANAGING DIRECTOR

Mr. W. H. Rigg has been appointed managing director of Firth Cleveland Tools Ltd., a member of the Firth Cleveland Group. He will operate from the company's Tipton works in Staffordshire.

MR. W. H. RIGG

Mr. Rigg was formerly managing director of Revo Electric Co.

☆

Mr. E. Eric Hughes becomes sales manager, Castrol Division, Castrol Ltd., as from January 1, 1962. He succeeds **Mr. C. E. R. Millidge** who is to become an assistant managing director on the same date.

☆

Georg Kent Ltd's engineering director **Mr. R. S. Medlock,** and mechanical meter marketing executive, **Mr. R. V. May,** recently left the U.K. for South Africa and South America, respectively.

Mr. Medlock will spend most of his four-week stay with Kent personnel at Johannesburg, S.A., and Salisbury, Southern Rhodesia. Mr. May, whose ultimate destination is the Kent Colombian associate company, Medidores Kent Colombiana, will travel the West Indies.

☆

Mr. D. L. Atkins has resigned from the board of Wilkinson's Tools.

☆

Mr. F. Menelaus has been appointed a director of Wilkinson's Tools, of Warrington, a member of the Staveley Group.

☆

The Fairey Co announce that as part of the reorganisation of board responsibilities, **Mr. G. C. D'Arcy Biss** has been elected chairman of the board. **Mr. G. W. Hall** remains a director of the company as well as being chairman of Avions Fairey S.A. which is engaged on a £12 million contract for production of the F-104G. Starfighter.

☆

The chairman of Fairey's Australian subsidiary, **Mr. R. E. Purves,** has been invited to join the board of the company.

MR. R. V. MAY

Mr. R. B. W. Bolland, formerly general manager of Head Wrightson Stockton Ltd., has been appointed London manager of Head, Wrightson & Co. Ltd.

☆

It has been announced that **Mr. E. L. Tuff,** Director and General Manager of the Projectile and Engineering Co., Thessaly Road, London, S.W.8, becomes deputy managing director on October 1st. He has been with the company for 30 years

☆

Mr. H. Kay, B.Sc., M.I. Mech. E., has been appointed assistant managing director of the engineering division of Tube Investments.

Mr. Kay is at present deputy managing director of the Marine Division of Richardsons Westgarth & Co. Ltd. of Wallsend, Northumberland.

NPL expands

WORK on three research buildings costing £1 million at the National Physical Laboratory, Teddington, due to be completed by 1963, was inaugurated on Monday by Mr. Richard Thompson, Parliamentary Secretary to the Ministry of Works.

He is seen (left) with Sir Gordon Sutherland, director of the laboratories, looking at a model of the buildings.

Work has started on a laboratory block for the autonomics division — automation and automatic control.

Coming EVENTS

THIS WEEK

Until October 11
49th Business Efficiency Exhibition, Grand Hall, Olympia, London.

Until October 12
Electronic Computer Exhibition and Business Symposium, Natonal Hall, Olympia, London.

October 11 - 21
International Knitting Machinry and Accessories Exhibition, Bele Vue, Manchester.

October 12 - 13
17th Colloquium on Hardening, Wiesbaden, Germany

October 13-21
German Industrial Exhibition, Berlin.

October 13-22
International Mechanical Handling Exhibition, Paris.

October 16-18
International Conference on the Metallurgy of Beryllium, Royal Commonwealth Society, Craven Street, London, W.C.2.

October 17-19
14th Engineering Display, Royal Horticultural Society's New Hall, Westminster, London.

October 17-19
Plastics Show of Canada, Toronto.

October 17-21
French Metallurgical Society Meeting on Metal Forming, Paris.

October 17-26
Industrial Equipment Exhibition, City Hall, Manchester.

October 18-26
International Motor Exhibition, Earls Court, London

October 19-20
12th Symposium on Corrosion in Nuclear Technology, Paris.

October 26-November 5
Los Angeles 39th International Automobile Show.

October 30-November 3
Symposium on Welding in Shipbuilding Institute of Marine Engineers, Mark Lane, London, E.C.3

October 31-November 1
Conference on Engineering with Plastics. The Plastics Institute, 6 Mandeville Place, London, W.1.

October 31-November 2
10th Canadian National Packaging Exposition, Toronto.

November 7-12
Sixth Meeting and Review of Automation and Instrumentation, Milan.

November 8-10
Testing in Electrical Engineering, Savoy Place, London, W.C.2.

November 10-18
43rd Scottish Motor Exhibition, Kelvin Hall, Glasgow

November 13-16
Seventh Annual Conference on Magnetism and Magnetic Materials, Phoeniz, Arizona.

November 13-16
National Maintenance Conference and Exhibition, Central Hall, Westminster, London

November 13-18
International Factory Equipment Exhibition, Earls Court, London.

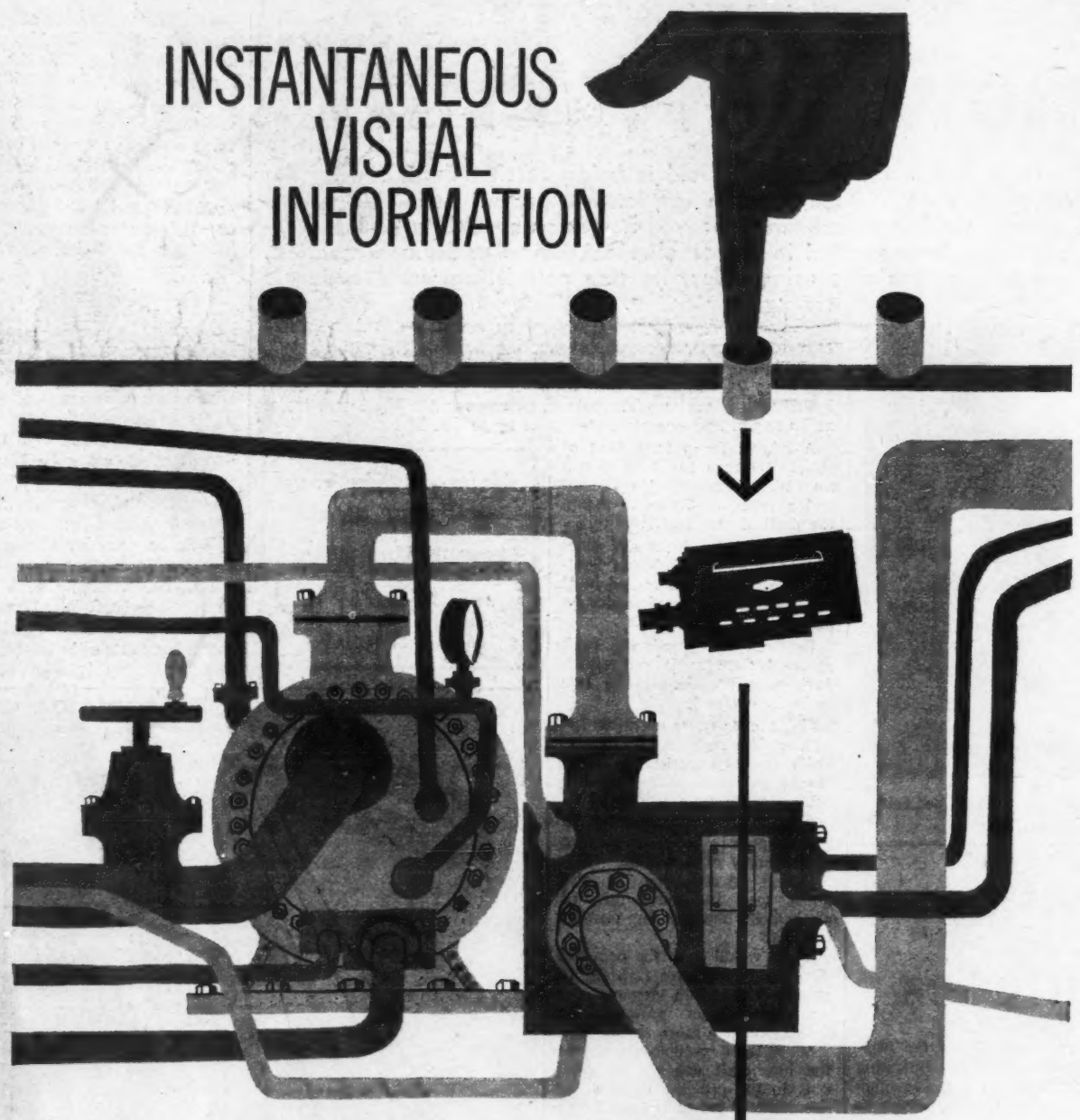
November 13-18
Second Engineering Materials and Design Exhibition, Earls Court, London.

November 15-29
29th Building Exhibition, Olympia, London.

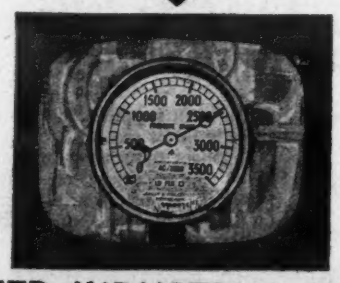
November 22-27
Fifth Conference and Exhibition on Automation and Instrumentation

November 27-December 1
Fifth Congress and International Automation Exposition, New York.

INSTANTANEOUS VISUAL INFORMATION



The whole pattern of industry today reflects the bold and imaginative thinking needed if the exacting demands of quality and productivity are to be met. Managements are facing new problems realistically. The immediate availability of visual information at selected points is now recognised to be just as essential a tool as the internal telephone. Pye T.V.T. Industrial Division offers a range of closed-circuit television equipment ready tailored to meet many requirements in all branches of industry. Your own problems may need special consideration, and we invite you to talk to us about the value of Instantaneous Visual Information to your organisation.



PYE T.V.T LIMITED INDUSTRIAL DIVISION
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LETTERS TO THE EDITOR

Wage-demand pressure

IN spite of (or because of) exhortations which cause irritation, wage demands after the "The Little Budget" are most likely to be intensified beyond a mere shred of expediency to urgent necessity!

Exhortation is fast becoming a by-product of weakness and a sign of ineptitude in dealing with a situation rationally.

This is not intended to convey the impression that the wage demands are justified, but rather to emphasise the futility of saying "No" and later on to give way!

This happens all too frequently, with the result that a new crop of demands usually occurs after conceding a previous one; it becomes a habit.

There is only one basis for increased pay, and that is when the economy of the undertaking can afford to pay! Today with costs already too high and ever-increasing, the ability to pay does not truly exist unless it be related to increased work and production.

Francis B. Willmott
River Street,
Birmingham, 5.

Origin of lathe lead screw?

CAN anyone tell me who made the first lead screw for a lathe and how he made it?

I can think of several ways it could have been made but I have never been able to trace the original method.

W. Mannheim
Acton,
London, W.3.

On show for the first time in London: static-carriage, no type bars

IBM REDESIGNS THE TYPEWRITER

'Golf ball' printing head allows typing speed of 180 words a minute

ELIMINATION of typebars, a static carriage, all 88 characters printed by a single typing element the size of a golf ball, a speed of over 180 words a minute—these are some of the outstanding features of the IBM 72 typewriter shown for the first time in London this week.

The spherical - section typing head, said to be as light as a single typebar, is mounted on a carrier which slides along a guide rod in front of the paper.

The head can be removed in seconds and replaced by another head with a different type style if required.

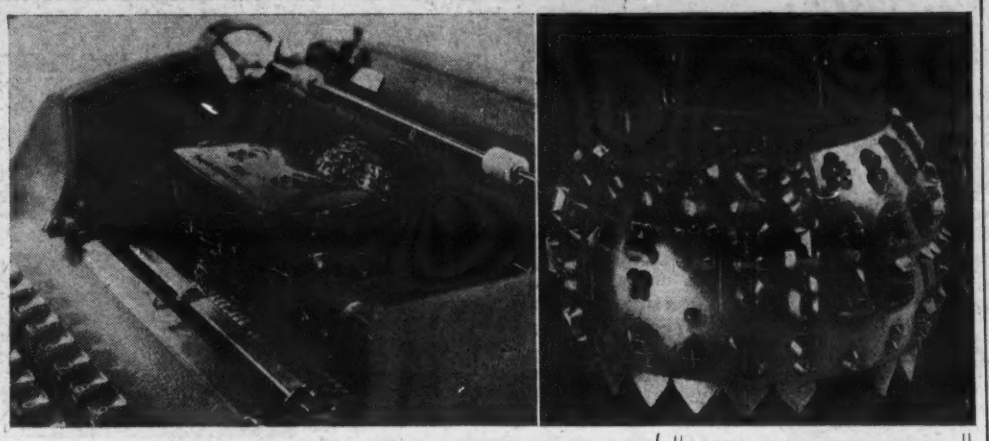
Printing action

As a key is struck, the typing head rotates and tilts to bring the appropriate character into position for printing. It then rocks against the ribbon to print.

Only 0.06sec. elapses from the time the key is pressed to completion of printing.

There are no typebars on the model 72 but there is a "stroke storage" system which stores a second letter for a fraction of a second (if two keys are struck almost together) and then automatically types it. It is thus impossible for a typist to beat the speed of the machine.

Ribbons are changed by clipping a cartridge holder on to the type carrier, and the machine embodies many of the familiar IBM features such as the Typamatic keys that repeat an operation automatically as long as the key is held down.



Above left: IBM's revolutionary typewriter set for action. Right: The "golf ball" head, central feature of the new design. It moves along a guide rod in front of the paper. As a key is struck it rotates and tilts to select the right character and rocks forward to print. It can be changed in seconds for a head with a different type style.

Stainless steel furnace

A HIGH - VACUUM, high-temperature furnace which can be used for sintering radioactive oxides, ceramics or cermets has been produced by Spembly Ltd., in conjunction with the UKAEA.

The design is based on a furnace built by J. H. Rendall at the National Physical Laboratory some years ago, but more efficient element clamping and water cooling techniques have been introduced as a result of Spembly's experience with tubular graphite element furnaces.

The heating element consists of tungsten strips formed into a tube and clamped in such a way that the cooling water pipes form a spring to reduce stresses in the element.

The furnace body is made of stainless steel and crucibles for containing the samples to be heated are of tungsten or tantalum.

The furnace is normally metered down to 10.00001 mm Hg, but at the operating temperature of 2,400 deg. C the theoretical limit is 10.000001 mm. This temture can be reached within 5 minutes from cold.

£400 scholarship

Salford's Royal College of Advanced Technology has re-received a £400 research scholarship by Ferranti of Hollinwood, Lancs. The college is to recommend a research student for noise measurement.

PLANT RECOVERS COSTLY ALLOYS

PLANT for recovering valuable alloys from steel scale during rolling operations has been specially designed for a new intermediate mill at the Stocksbridge Works in Sheffield of Samuel Fox.

Scale formed during rolling on stainless and other high quality steels often contain a high proportion of expensive alloying elements. Recovery of these elements is difficult as most of the scale falls off while billets are passing through the primary and secondary mills.

In the newly-designed plant, scale falling from the rolls of the billet mill is sluiced over a weir into a settling pit.

One of two crane-operated grabs then dredges the pit and lifts the scale into a waiting skip.

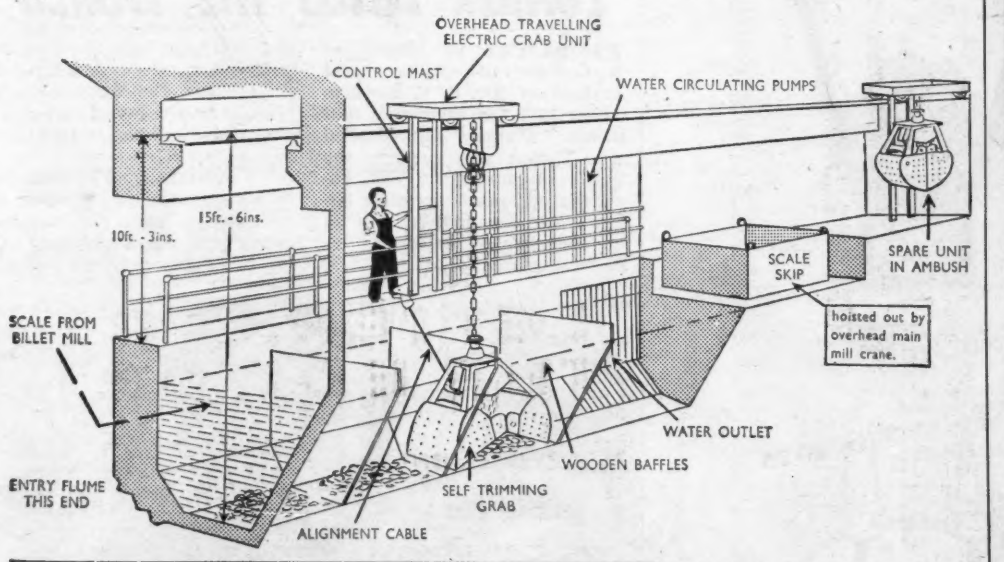
The cross-section of the pit is only 2in. wider than the self-trimming grabs so that almost complete recovery is achieved.

Low headroom

Low headroom introduced special difficulties and the ring discharge grabs were designed to have a fixed discharge height but a variable loading height.

Each grab has a level struck capacity of 7.5 cu. ft., an unladen weight of 17 cwt., and is suspended from an overhead travelling crab unit.

The plant was designed by Michael and Partners of Chesterfield.



HEALTH UNIT TO CHECK MANCHESTER FACTORIES

AN occupational hygiene unit is being set up in North-West England by Manchester University under a grant by the Nuffield Foundation. The unit, which will work on a fee-paying basis, is expected to be in operation early next year.

Problems it will deal with will include dust suppression in foundries and cotton card rooms, toxic substances in use in various processes, and temperature problems.

The project owes a great deal to Professor R. E. Lane, head of the department of occupational health at Manchester University, and a national authority on industrial problems, who has waged a campaign for more than five years.

Professor Lane told Engineering News: "Our aim is to bring the same facilities for checking on working environments in small and medium-sized factories as are already available in a few of the very large concerns in the area".

Czechs use ultrasonics to tin-plate aluminium

AN ultrasonic method of tin-plating aluminium and its alloys has been developed in Czechoslovakia. The equipment used for this work is designated VUMA-UZV3.

Good - quality tinplating is claimed to be achieved by the method.

A tank containing molten tin-solder is set vibrating by the action of an ultrasonic radiator. The part to be plated is submerged in the tank and a continuous layer of solder adheres to it in a matter of a few seconds.

By using this method it is said to be possible to tinplate unlimited lengths of wire, strip and other conductors made from aluminium and its alloys.

The plated surface is solid and corrosion resistant. Considerable savings of other non - ferrous metals, especially copper, are permitted by this development.

moved by YALE TRUCKS

The Ford Motor Company produce about 2,500 vehicles a day at Dagenham – and they employ some 150 Yale trucks to help them do it. The illustration shows core racks loaded with baked engine cores being moved by a Yale Worksaver to the storage area. Approximately 30,000 cores a day are handled in this manner.

Another typical example of Worksaver reliability is exemplified in the foundry where 4 Yale Worksavers working 16 hours a day move some 200 tons of fettled engine blocks in and out of lifts from one floor to another.

YALE ADVISORY SERVICE The Yale Advisory Service will give you free advice on any aspect of materials handling. A free booklet giving information about Yale Trucks and Hoists will be sent on application.

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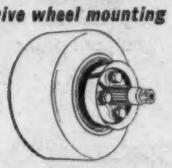
The world's largest range of materials handling equipment

THESE YALE FEATURES HELP TO CUT DOWN-TIME

Drive wheel mounting



1. Only Yale WORKSAVERS have taper bored wheels for easy removal. Wheels can be changed quickly without using a tyre press.
2. Wheel Hubs are slitted and tapered with splined bores to fit drive axle.
3. Movement of Wheel on Axle is non-existent–assures long spline shaft life.
4. Only Four Bolts are required to pull wheel hubs tight together against the tapered bore, thus clamping the wheel firmly to splined drive axle.

THE YALE & TOWNE MANUFACTURING COMPANY, MATERIALS HANDLING DIVISION, DEPT. ES.2 WEDNESFIELD, STAFFS.

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TAS/CC. 83

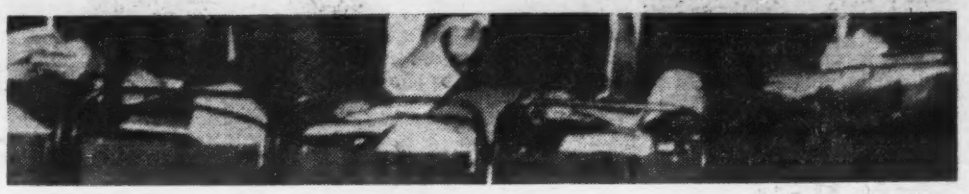
Opening the Second International Machine Tool Design and Research Conference at Manchester—Sir Steuart Mitchell, chairman of a committee which recently reported on the machine tool industry for the Board of Trade said: "The machine tool industry calls for the best crystal gazing into the needs of users in the next six to ten years."

2nd INTERNATIONAL MACHINE

More money must be poured into research

Dr. B. V. BOWDEN, PRINCIPAL, MANCHESTER COLLEGE OF SCIENCE AND TECHNOLOGY

LACK of quantity, and not quality, is the reason machine tool research has failed to keep pace with developments in space, electronics, aviation, and other fields. Sir Steuart Mitchell, Controller of Guided Weapons and Electronics in the Ministry of Aviation, told this to nearly 400 delegates from 14 nations at the opening of the 2nd International Machine Tool Design and Research Conference at Manchester.



'Results must be clear to men in the shops'

The conference ran for five days at the Manchester College of Science and Technology. It closed on Friday.

Sir Steuart said large sums of government money had been poured into research and development in other fields, and if only more money were given to the machine tool developers, there would be an increase in development and research which was long overdue.

More qualified scientists and engineers were needed, and much more encouragement from machine tool makers and users, and from the Government, universities, and technical colleges.

The machine-tool industry called for the best crystal gazing into the needs of users in the next six to ten years, said Sir Steuart.

Sir Steuart was chairman of the committee which recently reported on the machine tool industry for the Board of Trade.

In a survey of research and development in manufacturing methods and machine tools, Professor F. Koenigsberger said that scientific research had followed, rather than led practical progress in some fields.

He said it has been engineering practice when speaking of machine tools, to think only of machines which remove workpiece material in chips, so that a desired shape remains.

He suggested that any machine operating or acting as an instrument or tool for producing workpieces of a required shape, size and quality, should be considered a machine tool.

Impulses which lead to significant progress, cannot be given by odd improvements, but only by the development of new processes, tool materials and devices for control operations.

Prof. F. Koenigsberger, of Manchester College, said that research workers in addition to investigating many problems as yet unsolved, should develop methods of communication to such perfection that the results of their work can be easily understood, and applied by the man in the workshops.

This would lead to better co-operation between these two essential contributors to technological progress, a more efficient use of their work, and higher efficiency in production.

Second conference

This is the second time a conference of this character has been held in Britain. The inaugural conference, last year, was held at Birmingham University.

Annual research and design conferences are intended to be held alternately in Manchester and Birmingham.

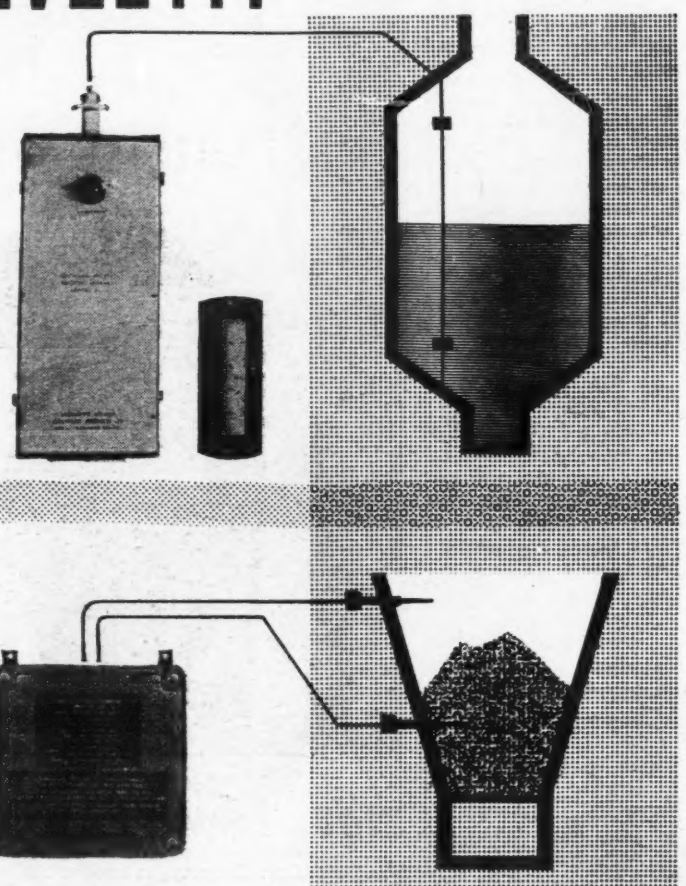
AT EVERY LEVEL...

Quantimeter

A NEW CONCEPT IN 'LEVEL' MEASUREMENT

- Automatic compensation against changing dielectric loss . . .
- Particularly suited for application to granular and powder materials . . .
- Errors due to variable moisture content substantially reduced.

Publication D11011 gives full details.



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- Fully transistorised operation . . .
- Intrinsic safety certification (IS3086) . . .
- Unlimited distance between probes and control unit . . .
- Fail-to-safety operation . . .
- Single and multipoint facilities . . .
- A range of probes to suit all applications.

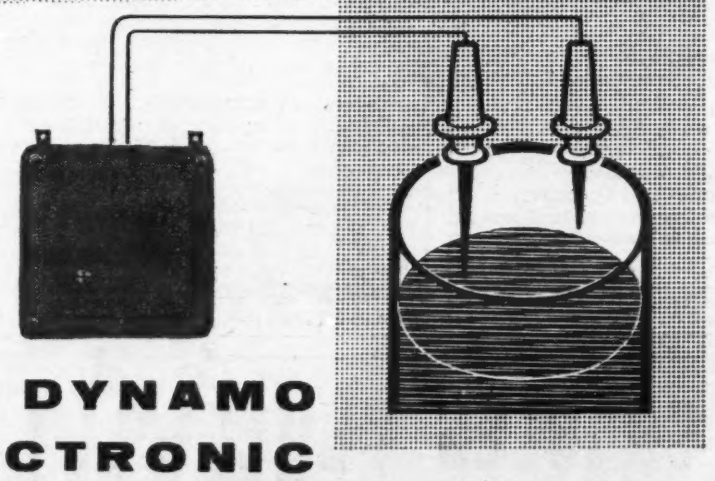
Publication D22011 refers.

Autodip

FOR LIQUID LEVEL

- Simple in concept . . .
- Easy to install . . .
- Rugged and reliable . . .
- Suitable for a wide range of liquids.

Details provided in publication D22012



LANCASHIRE DYNAMO ELECTRONIC PRODUCTS LIMITED

RUGELEY · STAFFS

M Group

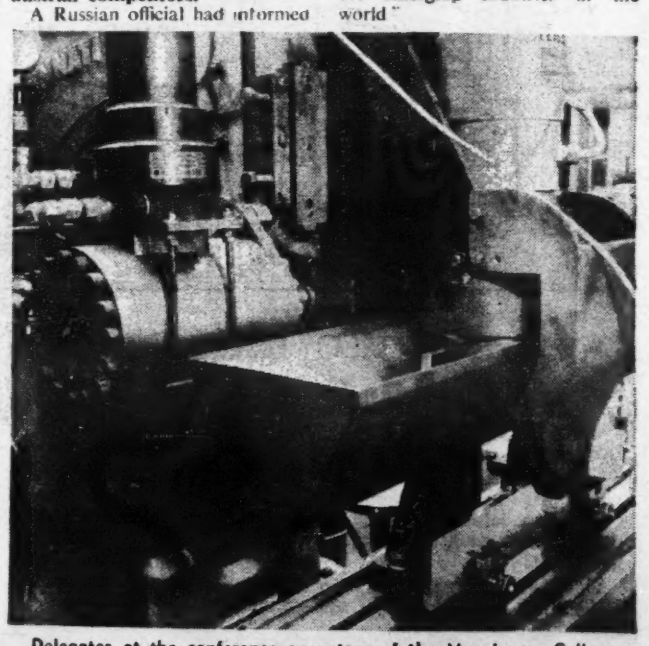
GP.21

'TRAGIC' THAT BRITAIN NO LONGER LEADS THE WORLD

PRINCIPAL of Manchester College of Science and Technology, Dr. B. V. Bowden, earlier told the conference that it was "a tragic and dreadful story" that this country, the leading manufacturer and developer of machine tools 100 years ago, should have lost its pre-eminence to its biggest industrial competitors.

A Russian official had informed him that they were spending £6 million a year on research and development. They were now in a position to drive out of the market other countries which had not been so imaginative.

"We cannot afford as a nation or society to allow ourselves to be a country which does not and cannot help to equip industries in the emerging countries of the world"



Delegates at the conference on a tour of the Manchester College research laboratories were shown this machine for grinding precision straight-edges which uses an electro-hydraulic servo-mechanism and master straight-edge.

TOOL DESIGN AND RESEARCH CONFERENCE

Prof. F. Koenigsberger, Manchester College of Science and Technology. His comment: Plenty of delegates, but not enough.

Dr. W. S. Hollis, Assistant Director, Production Development, Ministry of Aviation.

Professor H. Opitz, Technische Hochschule, Aachen, Germany.

Professor S. A. Tobias, Head of Mechanical Engineering at Birmingham University.

FORTY papers were read during the conference, presented at plenary and group sessions. Separate groups of delegates visited seven companies associated with machine tools in the Manchester area; three of the college laboratories were also open to view.

Among the more interesting exhibits in the Royce Laboratory was an automatically controlled grinding machine for finishing straight edges to a high degree of accuracy, independent of wear on the machine slides.

EXPERIMENTAL MACHINES AT ROYCE LABS

A master straight-edge is mounted on the machine table and is traversed together with the workpiece past a grinding wheel whose height is constantly controlled by an electro-hydraulic servo-system.

Attached to the movable mounting housing the grinding wheel is a sensitive capacitor-type probe which is controlled automatically at about 0.001in. from the master straight edge as this is traversed past the probe.

Should there be an inaccuracy in the table slides—which would cause the table and workpiece to move up or down slightly — this causes a variation in capacity between the workpiece and the probe.

Error voltage

This error voltage is amplified and operates an electro-hydraulic valve which causes a hydraulic piston rod to move the grinding wheel carriage up or down to minimise the error voltage and the probe is thereby maintained at the constant set distance from the workpiece as it is traversed past the grinding wheel.

As the movement of the grinding wheel carriage is so small a neat spring-loaded wedge mechanism with a small rise is used. This is connected to the hydraulic piston rod.

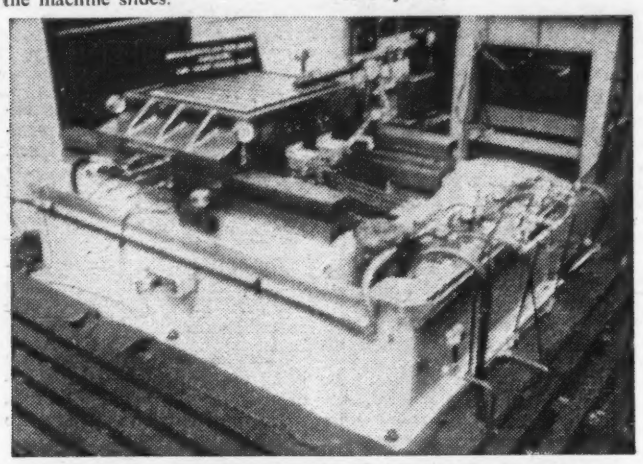
Experimental machines for testing hydrostatic slides were also on view. These use a relatively thick film of oil forced under constant pressure between the sliding surfaces of a machine carriage.

Among the advantages claimed for this method is the minimising of "stiction" when the carriage is moved by a sensitive servomechanism.

These machines were also being used to further develop the advantages of hydraulic drives. A long traverse using existing hydraulic drives involves a long column of oil which has a certain amount of elasticity and is a disadvantage when taking heavy cuts.

In order to stiffen this type of drive, a cylinder and piston of very short stroke moving with the carriage is used. The carriage comprises two parts; one part carries the cylinder and the other the piston.

On each of these parts are additional pistons which move out and clamp onto the machine slideways. Working in unison, these edge the table along the machine.



Design problems of this servo-controlled feed drive employing two short stroke hydraulic rams were the subject of a paper read at the conference by R. Bell, of the Manchester College of Science and Technology.

Comment: cut out the jargon

By our machine tools correspondent

IF the research technologist is to follow Professor Koenigsberger's suggestion that he should develop his communications with the man in the workshop, and so make his work more easily understood, a good start would be to take more trouble to use less elaborate terminology.

And the next step might be to consider the man at the production end. He wants more information on practical uses.

The synopsis of research data is important, but it is likely to be of greatest interest to other research workers.

If both these points were observed the conditions could emerge for a more fruitful discussion at this type of conference, bringing more engineers to the meetings, and the design engineers out of their shells.

The research worker setting out to increase the value of his contribution by making the results more widely known might consider, too, the different atmosphere of the laboratory and the shopfloor.

Time, in industry, is even shorter than money.

Many concerns cannot afford the time to go into detailed investigations of their research reports. Their quite reasonable interest is the practical use of the results.

Two-way affair

Such an exchange is a two-way affair. The design engineer needs an appreciation of research and the ability to use the resources of technical institutes and colleges in Britain and overseas.

IN the design of machine tools, where research and development must be far in advance of today's workshop needs, a real need exists for machine tool makers to run future project sections alongside their design offices.

Their function would be to investigate the possible designs that will be needed in 20 years time.

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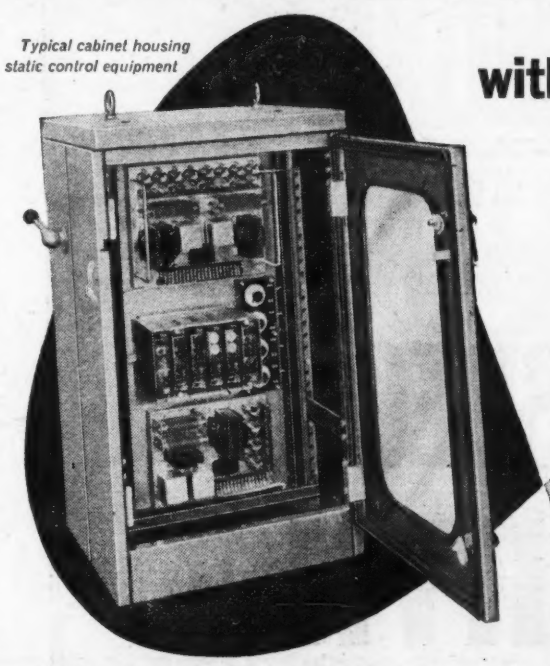
RELIABILITY THROUGH ELECTRONICS with G.E.C. STATIC CONTROL EQUIPMENT

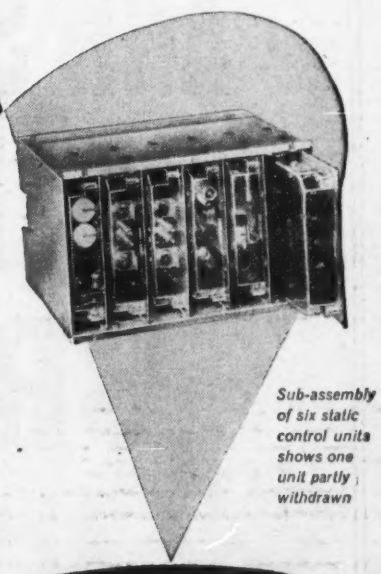
Typical cabinet housing static control equipment



The GEC static control system provides automatic control of any number of operations in which the basic requirement is the operation of electrically motivated hydraulic and pneumatic valves and other similar devices in a pre-determined sequence. The control system consists of interconnected sets of several types of standard units, the complete equipment controlling the order in which cycles of operations are carried out.

The entire system is housed in a cabinet, with terminal blocks for easy connection to the equipment to be controlled. The control panel with start switch, cycle-selector switch, manual controls and indicator lamps, can be incorporated in the cabinet or fitted remotely.

The inherent reliability of the control system is largely due to the almost complete elimination of moving parts. Faults can be traced immediately, and, as units are interchangeable, only a small number of spares need be carried.



Sub-assembly of six static control units shows one unit partly withdrawn

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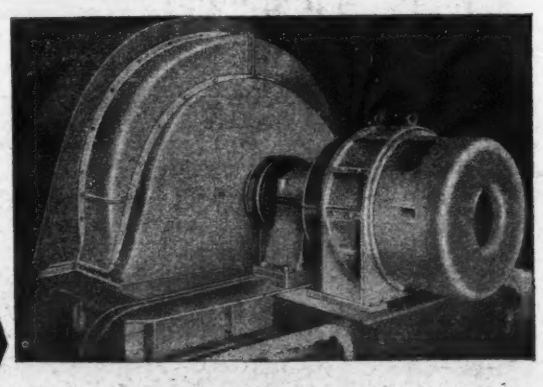

The illustration shows a Synchronous Motor and Exciter incorporating a "Harviglas" endshield and cover, typical of the wide range of Fibre Glass mouldings we produce for industry.

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Clean air from electric arc furnaces

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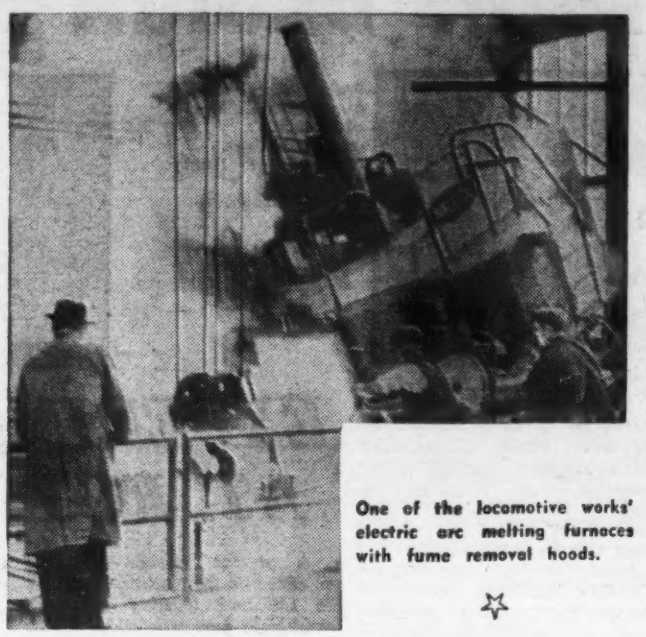
Crewe loco works install automatic filters



One of the locomotive works' electric arc melting furnaces with fume removal hoods.

☆

FULLY automatic, high temperature, bag filters and fume-removal hoods are used with new electric arc furnaces installed at Crewe Locomotive Works' steel foundry melting shop to comply with Clean Air Act.

The two furnaces are 3½ ton units by Birlec Efco (Melting). With these furnaces and the addition of oxygen into the melt in the refining stage, it was essential to provide the means of controlling the dense fumes emitted. At the same time, it was decided to clean the fumes so that there would be no visible discharge to the atmosphere.

The London Midland Region engineers, chose a plant using close-fitting hoods to control the fumes, and a fully automatic, high temperature bag filter to clean the fumes.

Team-work

The hoods were designed by Tilghman's of Altrincham, a member of the Staveley group of companies, in co-operation with the furnace suppliers. This close relationship enabled both furnace and hood modifications to be made in the design stages.

This resulted in a furnace hood which is effective, pleasing to look at, and which does not interfere with the operation of the plant.

Hot gases are drawn from the hoods through sheet steel ducting to the two dust-collecting plants by means of centrifugal fans, each designed to handle 14,000 c.f.m. at gas temperatures up to 275 degrees F.

The fans are driven by 35 h.p. enclosed squirrel cage motors running at approximately 1,460 r.p.m.

A hand-operated damper in the draw-off duct at the furnaces enables the operators to reduce the exhaust volume to suit the conditions, thus resulting in a saving in power being absorbed by the fan motors.

Gases cooled

A bleed-in duct is provided in each system so that cold air can automatically cool the hot gases should they exceed the safe temperature of the filter fabric used in the dust collector (275 deg. F).

Each system is fitted with a Tilghman high efficiency, fully automatic, high temperature fabric filter, to ensure no visible discharge to the atmosphere.

THREE-DAY EXHIBITION

THE Clean Air Exhibition showing equipment for the removal and measurement of fumes, smoke, and dust continues at Brighton today and tomorrow.

The exhibition, organised by the National Society for Clean Air, opened yesterday, and is accompanied by a conference.

The plant requires little operating attention.

The collector comprises four compartments, each housing 84 filter tubes made of Orlon, which can handle hot, corrosive fumes up to 275 deg. F for long periods without harm.

The first plant of this design installed by Tilghman's on an electric arc furnace used Orlon filter tubes. The plant has now operated for three years, without requiring replacements.

At a predetermined time, the mechanical cleaning gear is operated in turn in each compartment, which removes the excess filter cake from inside the filter tubes into the storage hopper below.

Auto-shut off

The gas flow through the compartment on cleaning is automatically shut off by means of a damper and the plant is so sized that the other compartments can handle the total gas volume, thus maintaining steady control conditions at the furnace.

A feature of this plant is the grouping of the temperature control gear, the dust collector pneumatic and electrical equipment, and the exhaust fan control gear all in one control panel, sited adjacent to the main furnace control panel.

This enables the furnace operator to start up and control the complete installation from one central source.

These latest two Tilghman plants bring the total number of plants using high efficiency bag filters used on electric arc furnaces to eight.

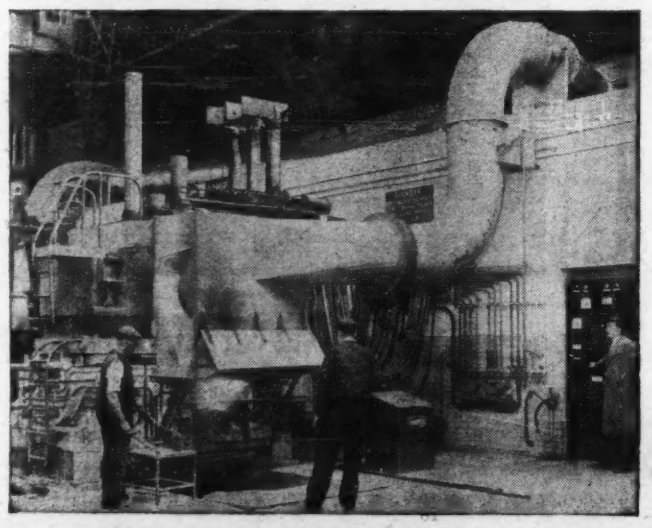
All these plants were commissioned within the last nine months, which indicates a change of heart in the steel industry in installing plants not only to remove the fumes from the melting shop — thus improving working conditions and labour relations — but also to ensure an efficient means of cleaning these fumes before discharging them, saving maintenance cost in roof repair and ensuring good relations with the local community.

New design

Tilghman's are at present developing plant, using a new design of furnace hood, aimed at reducing the amount of hooding on the furnace.

This plant will use a new design of fabric filter, which will be mass-produced in new factory extensions now under construction.

It is expected that these new developments will result in a more automatic and less expensive installation.



Livening the fire in the same furnace as top of the page picture. Note the swinging chimney-flap on the fume removal hood.

AUTOMATIC TRANSMISSION REDUCES POWER LOSS

Medium cars to have auto-change

AUTOMATIC transmission for medium-sized British and continental cars is being manufactured by Borg-Warner. They began production on Friday. It will be introduced on a number of famous makes at the Earls Court Motor Show which opens on October 18.

B-W's automatic transmission, to be known as Model 35, consists of two main components: a hydro-kinetic torque converter coupling capable of torque multiplication at an infinitely variable rate between 2:1 and 1:1, and a torque/speed responsive gearbox, hydraulically operated.

The torque converter is a single-phase, three-element type. The impeller is connected to the engine crankshaft; turbine to the gearbox input shaft; and stator to a sprag-type, one-way clutch supported on a fixed hub projecting from the gearbox.

The gearbox incorporates a planetary gear set — two sun gears, two sets of pinions, a pinion carrier and ring gear — providing three forward ratios and reverse. Helical involute tooth forms are used throughout.

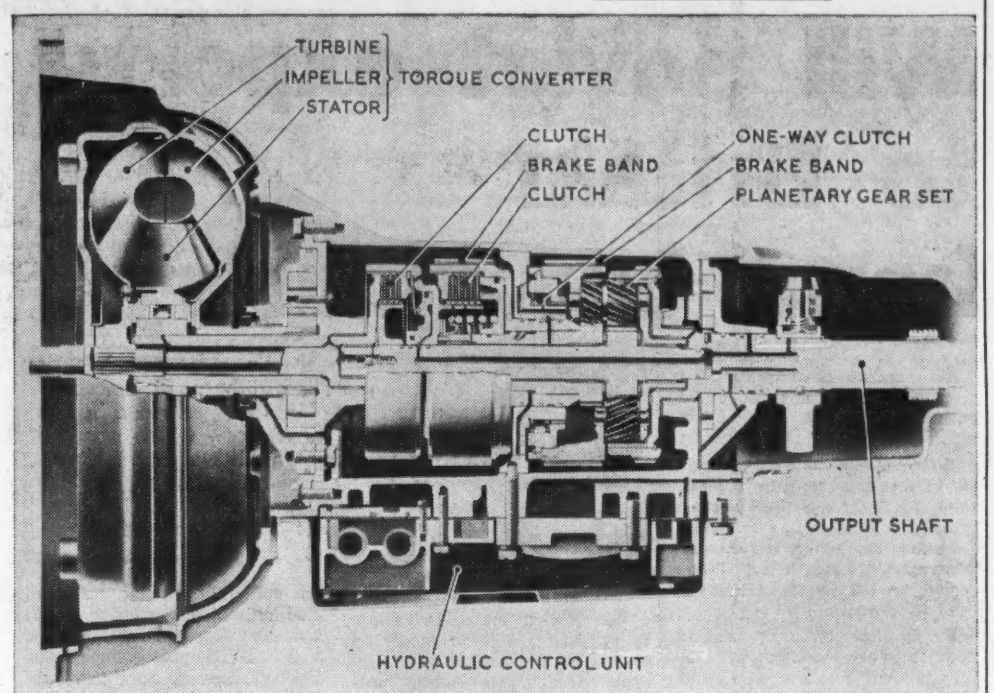
Multi-disc clutches, operated by hydraulic pistons, connect the converter to the gear set, while brake bands, operated by hydraulic servos, hold elements of the gear set stationary.

The five manually selected positions of the transmission are: Lock-up, Drive, Neutral, Reverse and Park.

The Drive position is used for all normal driving conditions. Automatic change occurs through forward gears, up and down, depending on road speed and accelerator position.

With Lock-up selected, the transmission starts in first gear and remains in this gear giving maximum engine braking. If selected while in third gear, immediate down-change to second will occur, giving moderate braking.

When the vehicle speed reduces to below 10 mph., the transmission automatically changes to first gear and remains locked.



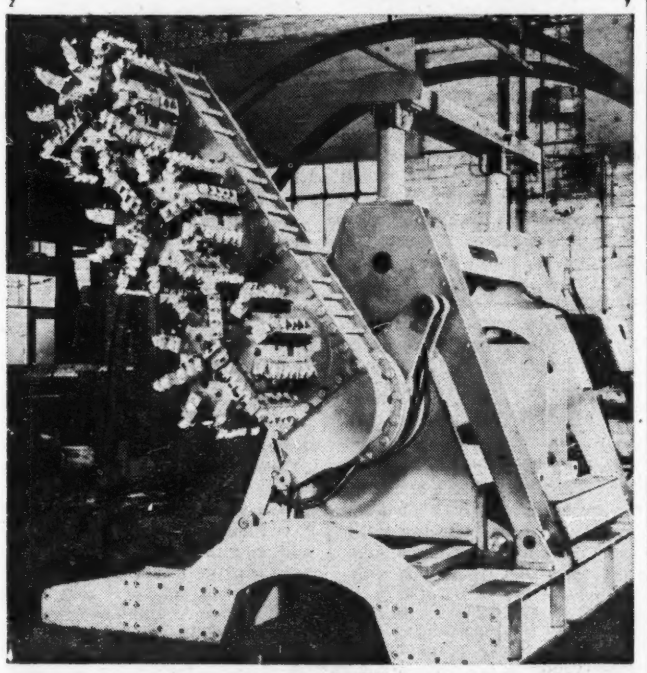
Cross section of Borg-Warner's Model 35 automatic transmission which can be seen at the Earls Court Motor Show from October 18.

Drive-shaft lock

Park mechanically locks the gearbox output shaft to the gearbox case and effectively immobilises the vehicle. The engine starting control is made inoperative when the selector is in any driving position.

The transmission gearbox can be used with 9½ or 11in. converters according to engine torque characteristics. Converter and extension housings are varied to suit a variety of vehicles, using the basic gearbox. Extensive use of light alloys has eliminated the extra weight usually associated with automatic transmission.

MINE TUNNELLING MACHINE FOR NCB



This mine tunnelling machine, cutter arm on left, cuts 2ft. of roadway 13ft. wide and 10ft. high in 60 minutes.

AN experimental machine designed by the central engineering establishment of the National Coal Board to tunnel mines has been built by Joy Sullivan of Dronfield.

In 60 minutes it cuts 2 feet of roadway 13 ft. wide by 10 ft. high in shale measures normally associated with coal seams.

It is powered by a 60 h.p. electric motor with fluid coupling transmission, and is mounted on skids. It is pulled forward and positioned using wire ropes, anchored under a stone lip, actuated by independently controlled rams on the base.

The cutter arm is controlled by hydraulic cylinders and has a fast return to the cutting position. Advance of the head is also hydraulically actuated providing independent advance and retract over a 2 ft. 3 in. range before the base is advanced.

Provision is made for a cross conveyor beneath the cutters, feeding on to a main roadway conveyor to remove the stone chippings.

Stability of the machine during the cutting cycle is provided by means of an outer support on the base to balance the moment required for cutting. To ensure complete stability a twin-ram arrangement retains a positive loading between the roof and the machine.

Welding firm builds in Dumbarton

THE British Oxygen Co. Ltd. plan to build a light engineering plant at the Strathleven Industrial Estate, Dumbarton, where a 600,000 sq. ft. site has been allocated to the company.

It is expected that some 2,500 employees will be taken on within two years of opening the works.

The factory will be employed on production of light equipment for use on oxy-acetylene welding.

More jobs

The Dumbarton area has been one of the worst hit by unemployment in recent years, largely as a result of the close-down of the textile finishing industry in the Vale of Leven.

The new plant should go far towards absorbing the available work force which is largely male labour with experience in engineering.

Blackburn Engineering also closed down in this area and some of the labour will be available from that source.

British Oxygen have a big plant at Polmadie in Glasgow which is now being extensively developed. They also have subsidiary units in Hillington Industrial Estate.

PLANT FOR RUMANIA

MELTING plant worth £250,000 for two Rumania factories is shortly to be sent from the Incandescent Heat Company's works in Smethwick.

It includes an 80 ft. swivel charger track which will load raw materials into furnaces in a radiator factory.

Part of the plant is a complete vitreous enamelling plant for finishing cast-iron baths — the product of the other factory.

The rest of the equipment includes cupolas, charging machines, blast heaters, and hot-metal receivers.

AMERICAN LETTER

1-lb magnet produces field of 43,000 gauss

AN electro-magnet of tremendous power, based on the use of superconductors, has been developed by the Westinghouse Electric Corp.

The unit is the size of a doughnut and produces a magnetic field of 43,000 gauss. Westinghouse say that equivalent power could only be achieved from a conventional magnet weighing many tons.

Superconductors, metal alloys held at low temperatures, offer almost no resistance to the passage of electric currents and once induced a current will continue to flow in a closed circuit indefinitely.

The alloy used for the superconducting magnet is of niobium and zirconium and the operating temperature required is −450°F.

Five-thousand turns of wire made from this alloy are wound into a 2in. coil, 1½in. long, and cooling is effected with liquid helium.

Westinghouse hope to produce a magnet of this type with a field of 100,000 gauss before the end of the year.

One of the most interesting applications for the unit is the provision of magnetic "bottles" to contain atomic particles at very high temperatures for research into nuclear power generation.

* * *

TO extend the present small knowledge of ocean beds the electronics group of General Mills have designed a two-man submarine which can hover at any depth up to 6,000ft.

Under 19ft. long and weighing six tons, the vessel can stay submerged for 12 hours. It has skitype skids and an electro-mechanical manipulator for collecting samples.

The use of glass fibres for submarine hulls is also being considered. Much weight would be saved and the shape could be spun as rocket engine cases are at present.

* * *

THE delaying effect of dodecyl alcohol on the rate of fatigue crack propagation has been shown by studies made at the U.S. National Bureau of Standards.

Fatigue failures progress through two phases, first, crack initiation, starting with initial stress load and producing the first crack; second, a period of crack propagation ending with abrupt fracture.

Tests were carried out on steel, stainless steel, aluminium and beryllium copper. When treated with dodecyl alcohol the increased number of cycles required to propagate cracks varied by factors ranging from 1.4in stainless steel to 5.0 in beryllium copper.

For the tests the specimens were stressed in the clean condition until initial cracking appeared. The alcohol coating then applied delayed crack propagation.

How this film affects the mechanics of surface reactions is not understood, but there is evidence that oxygen and water vapour react in defects and speed up fatigue failure.

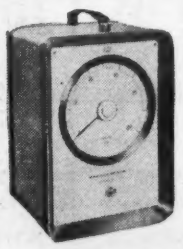
Much more needs to be known about the fatigue process before an analysis of this particular treatment can be made.

ANOTHER NEW PRODUCT

PP4 PRECISION PRESSURE TRANSDUCER

First of a new range of potentiometer transducers, the PP4 employs the unique JLT "X-Flex" suspension* to transmit deflections of the Bourdon tube element to a precision ceramic-based potentiometer*. Prime features of the suspension are the complete elimination of wearing parts and built-in g-compensation to reduce external acceleration effects. Precision engineered throughout, this transducer combines high accuracy with utmost dependability. Write or phone for full specification.

*Prov. Pat.



Transistorised Indicator type PML 6009 is designed for use with PP4.

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JLT TRANSDUCER DIVISION

USSR STEPS UP PRODUCTION: MOSCOW TRAINS HER SALESMEN

Expensive catalogues show what Russia can export. The current 7-year plan pledges her to raise standards at home and in the Communist Bloc. Will this leave sufficient to trade with the West?

Will Soviet exports to Britain harm our industry?

WITH the technological advances made in the Soviet Union during and since World War II—and in certain fields like space research they are at present leading the world—one is bound to ask: how is this going to affect the engineering industry of the U.K.? Could it harm some of our own industries like machine tools if Russia exported into the U.K. large quantities at low prices?

There was considerable interest in this section of the recent Soviet Exhibition at Earls Court, and the National Coal Board did in fact buy a machine for mining coal.

Apart from traditional exports—timber, grain, iron ore and many base metals including gold—the Russians have introduced a variety of consumer goods. At the Soviet exhibition where £18 million worth of orders were placed, the Soviet Trade Delegation listed items sold to the U.K.: a three-ton excavator; 23 metal-cutting machines; 23,000 ball bearings; 71 printing machines; 1,000 cameras; 500 miscroscopes; watches; and a considerable quantity of non-ferrous metals, chemicals, and timber.

No breakdown of prices was given but the raw materials could have accounted for most of the value.

Russian cameras have proved to be first class, both for colour and black-and-white photography. The U.K.'s camera industry has never met home demand, so the effect here could be felt by the Germans and Japanese.

Russia has built up a fine watch industry—but they are not yet producing the self-wind watches now becoming increasingly popular.

But these are not the only products the Soviet Union hope to sell in the U.K.

Mr. J. B. Scott is a director of Crompton Parkinson Ltd. In 1954, he led a British trade mission to Moscow which resulted in the Kabanov plan. He was also business adviser to Sir David Eccles on a 1959 mission which produced a five-year Anglo-Soviet trade agreement.

The Soviet Trade Delegation in London is able to supply 74 catalogues and leaflets on equipment from gear-cutting and thread-cutting machines, automatic looms for the textile industry, tyre builders designed for assembling multi-layer car tyres on collapsible drums, cars including the new smaller family cars—the Moskvitch 407 and the Volga M-21K—motor-cycles and scooters, down to boys' and girls' junior bicycles. Many of these catalogues are beautifully produced in multi-colours and in English.

At the heavy end of the scale they have catalogues covering turbo-alternator sets up to 200,000 kW printed in Russian, English and German, well illustrated and showing many detailed drawings. Some of our own industries can learn a lesson here on presentation and salesmanship.

What we must consider is: whether the Soviet Government can produce the goods they say they are now prepared to export.

Their own industrial development programme under the current Seven-Year Plan is so large that they will have little, if anything, in capital goods to export to the Western world.

Inside the Bloc

This does not mean they do not have the capacity to export to the other communist countries; indeed, the Institute of Directors' Mission to the Soviet Union last year saw at the Electrosila Works in Leningrad large alternators being manufactured for export to China—a country which before the last World War was traditionally a British market.

It may be reasonably assumed that for prestige and propaganda purposes, the Soviet Government will make available all the goods, such as cameras and watches, required to meet the limited quotas they can arrange with the Board of Trade under the Five-Year Trade Agreement at present in operation.

What the Soviet Union lacks at present are well-trained sales engineers who can travel freely round the Western countries.

One of the obvious failures of the Soviet Exhibition in London was the shortage of people manning the stands. Considering that in area and numbers of exhibits they had a larger exhibition than the United Kingdom one in Moscow, and that we had over 2,000 representatives each day at our exhibition compared with only 300 at the Earls Court Exhibition, it is not surprising that so many visitors were unable to get details of the exhibits. However, the Soviet authorities are aware of this shortcoming, and at any future exhibition they will probably provide adequate staff.

On the question of salesmen, there are already in Moscow special schools for salesmen who will be ready when the time comes for a rapid expansion of Soviet exports.

Development is so fast in the Soviet Union that it is not easy to guess when this time will be but short of war come it will and it will mean another major power in competition with Britain.

Best of both worlds

There are, of course, many ranges of products in which we can work together. No country in the world knows everything, and if we can exchange the best of each, surely this is to the good of both.

What the Soviet Union would like to do is to sell petroleum products to the U.K. The U.K. government has repeatedly refused this as there is a world surplus of oil.

The fact is, however, that our oil imports are going up by about 15 per cent per annum; this year, with the increased tax, it is expected to go up by about 8 or 9 per cent.

The Soviet Union would like a 5 per cent quota, which would not affect our present suppliers and would earn for the Soviet Union about £25 million sterling. They assure us this would be spent in additional orders for British goods.

This would have the effect of greatly increasing our exports immediately.

Last year the total imports of petroleum products into the U.K. from over 25 countries amounted to £482 million of which only £1.4 million came from the U.S.S.R.

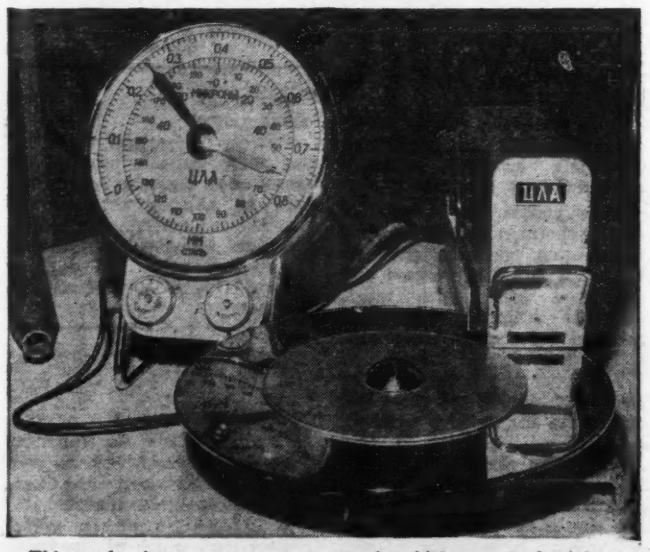
From Venezuela we purchased £62 million of petroleum products, but Venezuela only purchased goods worth £28 million from the U.K.

Little increase

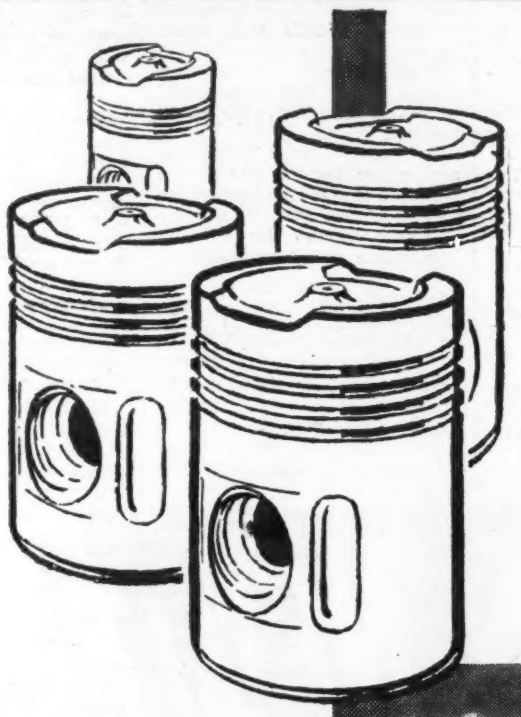
It is probable, however that apart from oil imports there will be no great increase in consumer goods and manufactured goods from the Soviet Union.

The Soviet Union standard of living is 20 years behind the best in the U.K. and the U.S.

But she is rapidly catching up; certainly in basic industries like steel. In the meantime the home requirements of her own 200 million people, not to mention the 600 million on her doorstep, will take up most of the exportable production for at least the next decade

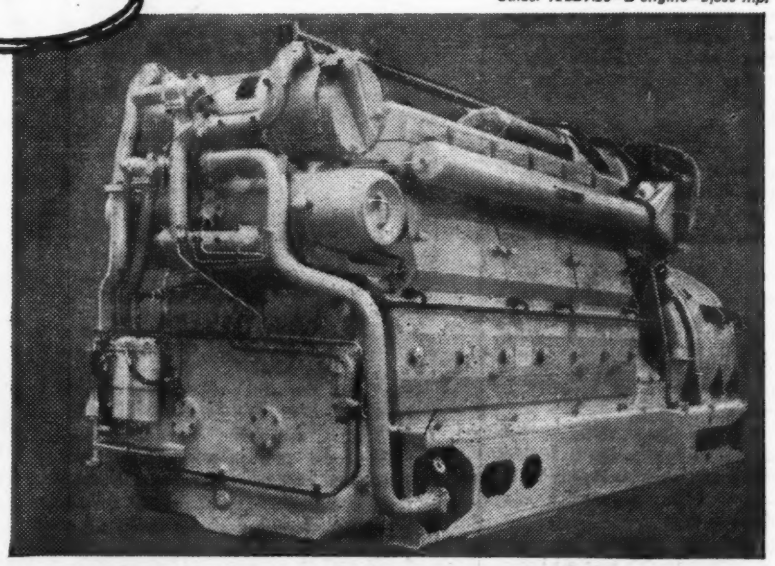


This nucleonic-type gauge measures the thickness of aluminium sheet. It aroused considerable interest at the recent Soviet Exhibition in London.



Duralumin pistons make engines light hearted

Sulzer 12LDA28—B engine—2,500 h.p.



Vickers-Armstrongs (Engineers) Ltd are using Duralumin 'J' to make the pistons for the Sulzer engines which are being incorporated in the new diesels on British Railways. Vickers chose 'Duralumin' because it combines high strength with light weight. These pistons are being produced in the James Booth Forging Department which houses the 12,000-ton forging press capable of producing large forgings up to a weight of 3 tons.

Consider the use of light alloy forgings in your business—you will find the James Booth service refreshingly helpful.

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EDUCATION and TRAINING

INDUSTRIAL Administration, management consultants, have drawn up a useful list of the responsibilities of member firms of EIGA, the Engineering Industries Association Group Apprenticeship Scheme. They should:

Specify the number of apprentices they wish to sponsor;
Nominate an official to the group committee and be responsible for arranging to implement training plans in the firm;
Accept responsibility for normal discipline, payment, and supervision of apprentices indentured or temporarily attached;
Arrange for apprentices to work under guidance of skilled craftsmen;
Provide training facilities for the same number of apprentices as they have sponsored;
Allow part-time day release to apprentices following courses at technical colleges.

EIGA—FIRMS UNITE TO AID APPRENTICES

WITH the larger engineering companies devoting time and money to training all the apprentices they can absorb, the best hope for substantial advance in the number of young men preparing to become skilled workers lies with the smaller companies.

The snag in this is the scope or lack of it, in the organisation employing only a few processes. For the firm with little to offer in breadth of apprentice training the drawback is twofold.

If all-round training is not possible applicants are less likely to put in an appearance. And it is all too easy for the organisation concerned to drift along, doing nothing much about training, picking up its skilled men by recruiting men whose training has been paid for by others.

But there is an easy answer to this, and one that is growing in application. It is the Engineering Industries Association Group Apprenticeship scheme. EIGA groups which began in London are now operating in the Midlands, in the Home Counties and in the North West.

The essence of group apprenticeship is the association of a number of firms to pool their training resources, the result being a comprehensive course able to give the apprentice the breadth of experience he could expect from any of the leaders in this field.

On the move

An EIGA group is normally formed between 12 and 30 firms. Following the course of training worked out for him, the apprentice moves from firm to firm, widening his experience over a range of operations.

A usual arrangement is for the first 12 to 18 months of an apprenticeship to be spent with the home, or sponsoring, firm. The last year of the course will also be spent with the apprentice's own company.

A scheme of this kind needs careful organisation if it is to work and a pattern has been evolved. This entails a committee of executives from the firms taking part.

Their meetings are usually attended by representatives of the youth employment service and of local educational bodies when their advice is needed.

Since a link is desirable with the Local Training Committee, set up under the 1947 National Agreement, the secretary of the appropriate engineering employers' district association is usually kept in the picture.

Later a request is made for one of the employers on the EIGA committee to be co-opted onto the Local Training Committee.

Experience with the scheme has shown that the loyalty of the apprentice to his firm has not been disturbed by the more diverse form of his training.

This has partly been because of the terms of the arrangement in which each participating firm is responsible for the usual conditions of employment, the payment of wages and the detailed care of the individual apprentice's skilled supervision.

At the centre of the group is the Group Engineer, provided by the training division of Industrial Administration, the consultants who were first asked to operate the London pilot scheme.

GE—key man

The GE, acting in the role of apprentice supervisor, helps with recruitment, gets out each apprentice's training programme and supervises training.

He is also the key man in arranging between the companies the apprentice-exchange which is the chief weapon in the EIGA armoury.

Young men from these schemes are regularly appearing on day release at the technical colleges. The sponsorship of the Institution of Engineering Designers, the Glass Manufacturers' Federation, and the Institute of Personnel Management is a measure of the recognition which the scheme has earned.

Technical problems of group training are handled by the EIGA training advisory committee. The professional institutions are represented on the committee, which advises on the application of group training in such fields as syllabuses, training programmes, and ways of carrying out training.

Craft apprentices and technicians, student engineers and graduate apprentices all appear among those making use of group schemes.

How are indentures handled in group apprenticeship? The answer is only slightly different from that in any other scheme.

Indentures, generally for five years, are signed by the apprentice, one of his parents or guardians, and a director of the sponsoring firm when the apprentice becomes 16.

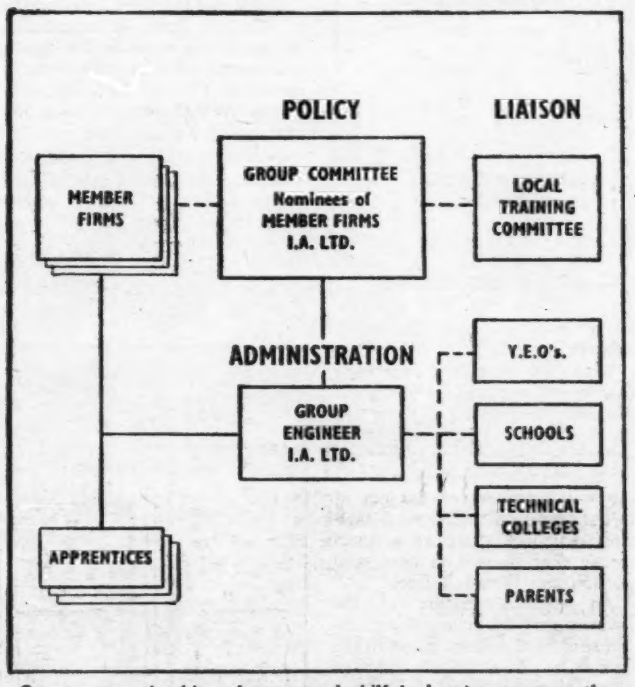
Bound by rules

The company contract to maintain their apprentice in continuous employment over the period laid down in the indentures, and the apprentice, in his turn, agrees to be bound by the rules of the sponsoring company and any firm for which he may be working.

Technical education is handled through approved courses by day release, block release or sandwich courses. The group engineer comes in here, advising apprentices on the most appropriate courses of study and keeping in touch with the teaching staffs.

EIGA student engineers are eligible for a number of scholarships, including the limited number — 225 — of technical state scholarships available which make it possible for boys of outstanding ability to follow full-time courses leading to the Diploma of Technology.

These are normally granted by the Ministry of Education on the results of the national certificate examinations.



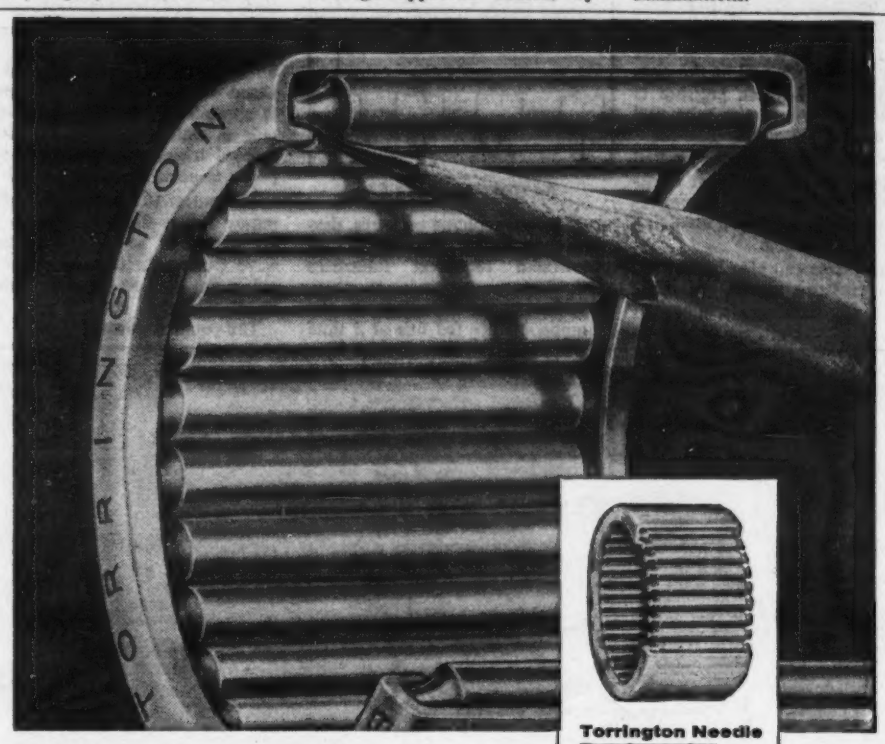
Group apprenticeship schemes need skilful planning to meet the needs of the boys in training, the member companies and educational organisations.

FUEL CELL COURSE

A COURSE of six lectures on Fuel Cells for Production is to be held at the Polytechnic, 309 Regent Street, London, W.1 on Mondays from 6.45 to 8.45 p.m.

The course commences on October 16, 1961, and costs £1 1s. including registration fee.

The synopsis includes energy sources, comparison of heat engine and electrochemical cell, cell chemical reactions, electrode and electrolyte combinations, electron transfer at electrodes, efficiency-current relation, three-phase gas fuel cells, temperature effects, materials and control problems, applications, and economic assessment.



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new PATENTS

TUBE AND PLUG PRESSURE-WELD

THE invention covered by the **United Kingdom Atomic Energy Authority's Patent No. 877,580** uses the plastic flow properties of a material under stress to transmit pressure to workpieces which are to be welded together—in particular a metal tube and end-plug assembly. By providing substantially uniform pressure over the whole of the welding area, the process results in a pressure weld of uniform quality.

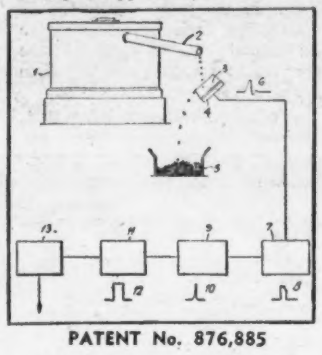
The method consists of inserting the plug in the tube in position for welding and placing a deformable washer around the tube opposite the desired weld area. The washer is compressed axially between a rigid container and a rigid bush within the container; radial inwards pressure is thus transmitted to the tube and plug to form a weld.

The process is particularly suited to the welding of beryllium workpieces, since beryllium is preferably welded by a method involving solid piece welding.

The process can also be applied to the pressure welding of other metals, for instance, magnesium alloys.

COUNTING SMALL OBJECTS

A PIEZO-ELECTRIC crystal is used as the sensing element in instrumentation for counting very small components, for example, sapphire tips of the kind



PATENT No. 876,885

used in gramophone pick-ups, described in **Patent No. 876,885 of Associated Electrical Industries Ltd.**

Referring to the diagram, the components are fed one at a time by a vibratory feeder 1 down an inclined tube 2 on to a small disc 3 rigidly attached to a piezo-electric crystal 4. The kinetic energy of each component causes a deformation of crystal 4 thus generating an electrical impulse of waveform 6.

The crystal is chosen to have a high natural frequency in order that it may recover quickly and be ready to detect the next impact. The voltage impulse from the crystal is thus a severely damped sine-wave of about 1 m.sec. duration.

This is passed to a conventional amplifier 7 which produces an amplified impulse 8, also of 1 m.sec. duration. The waveform 8 is applied to a pulse-shaping circuit 9 which produces a steep-fronted triggered pulse 10 in response to each input impulse 8.

The pulses 10 are used as trigger pulses for a flip-flop circuit 11, the output of which is a square-wave pulse 12. The square-wave pulses are used as counting pulses in an electronic counter 13.

The counted-down output of the electronic counter may then be applied to actuate a mechanical counter.

Al-Mn-Fe SERIES OF ALLOYS

IF manganese is added to an iron aluminium alloy in appropriate quantities, an air-melting alloy can be produced with a lower specific gravity than steel, but without the disadvantage of notch-sensitivity and low notch impact strength that generally besets such alloys.

Rolls-Royce Ltd.'s Patent No. 876,723 describes a series of aluminium-manganese-iron alloys of this improved character, with an Izod impact resistance of at least 30 ft.lb. after forging, containing 6-10 per cent by weight of aluminium, 20-40 per cent manganese, and not more than 1 per cent carbon.

To attain the desired properties, there is at least 14 per cent more manganese than aluminium in the alloy. It may contain up to a total of 4 per cent of one or more of the following hardening elements: columbium, nickel, cobalt, nitrogen, vanadium, molybdenum, tungsten, silicon, copper; and up to a total of 0.5 per cent of boron, titanium or zirconium.

These alloys can be cold worked, are easily welded and retain their toughness at the weld, and are readily machinable. Their corrosion resistance is much greater than that of mild steel, particularly if given a light oxidised finish.

The Table above shows typical properties: alloys I and II, outside the range covered by the Patent, are included for comparison.

The good properties of these alloys are believed to be due to the solubility in them of embrittling trace impurities such as oxygen and nitrogen.

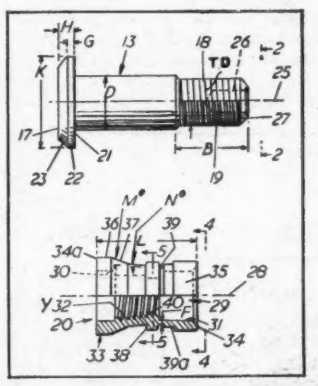
Alloy	% Al	% Mn	Heat Treatment	0.1% Proof Stress (t.s.i.)	U.T.S. (t.s.i.)	% El	% RA	Izod (ft. lb)
I	6.23	15.23	As forged	40	45.5	26	40	5
II	8.32	19.8	As forged	25	25	0	0	2
			240 hrs. at 400° C.	0	0	0	0	0
			165 hrs. at 525° C.	34	34	1	0	0
III	8.40	25.1	As forged	38	40	6	20	63
IV	8.10	29.8	As forged	35	41.5	14	20	96
V	8.35	30.9	As forged	35	42.5	15	25	111
			240 hrs. at 400° C.	42	58	15	17	11
			165 hrs. at 525° C.	18	18	0	0	0
VI	7.50	25.5	As forged	36	44.5	21	30	83
			150 hrs. at 460° C.	36.5	45.7	30	50	22
			20 hrs. at 560° C.	32.5	45.5	35	66	73
			20 hrs. at 660° C.	29.5	44.0	38	60	100
VII	8.20	33.5	As forged	34	48	30	35	101
VIII	8.10	36.3	As forged	30	46.5	40	60	98
			240 hrs. at 400° C.	29	44.5	30	35	45
			165 hrs. at 525° C.	9	9	0	0	0
IX	6.70	27.6	As forged	29	40	35	40	102
			150 hrs. at 460° C.	No tensile properties available				97
			20 hrs. at 560° C.	No tensile properties available				85
			20 hrs. at 660° C.	29	41	44	73	98
X	6.0	30.0	As forged	25	37.5	47	75	104
			150 hrs. at 460° C.	25.5	38	45	74	102
			20 hrs. at 560° C.	26.5	38	42	72	106
			20 hrs. at 660° C.	27	38.5	43	70	106

0.1% Proof Stress = Stress (in tons per square inch) at which the test piece is strained by 0.1%"
U.T.S. (t.s.i.) = Ultimate tensile strength in tons per square inch
% El = Percentage Elongation
% RA = Percentage reduction in area
Izod (ft. lb) = Izod impact figures in foot pounds for notched-round standard test pieces

PRE-LOAD PIN AND NUT FASTENER

A THREADED pin and nut fastener which can be tightened to hold a limiting predetermined torque is described in Patent No. **867,012, taken out by Hi-Shear Rivet Tool Co., California, U.S.A.**

In this fastener, a headed and threaded pin 13 is provided with a wrench-receiving recess 25 in its threaded end. The nut 20 has internal threads extending over part of its length, and at one end



PATENT No. 867,012

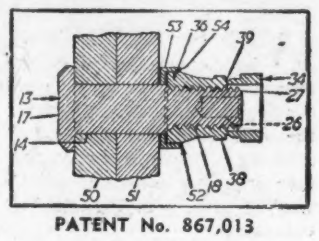
it is provided with hexagonal wrenching surfaces.

Thus by applying opposing torques to wrenches engaging the pin and the nut, the fastener can be tightened. A circumferential groove 39 in the nut, at the end of the threaded portion, reduces the wall thickness of the nut at this station to a calculated dimension that will shear at a given torque. The sheared-off hexagonal portion can then fall free.

An optional feature of the invention is an enlarged circumferential bead 38 contiguous to the groove, and a locally applied elliptical distortion of the hole in the nut at this point. These two features together provide a retaining section which grips the pin and maintains the fastener in its torqued condition.

Because the reaction force between workpiece and nut may vary from installation to installation, depending on surface finish, cleanliness, and other factors which influence friction, it may happen that although the calculated torque is applied, the corresponding tensile preload in the pin is not achieved. This problem has been solved by **Patent No. 867,013** which provides for a lubricated washer 53 between the workpiece and the nut.

An adherent dry lubricant such as a polar wax is applied to one



PATENT No. 867,013

or both sides of the washer. This assures that the reaction forces due to bearing of the nut against another surface are constant and predictable.

HEATER FUEL FEED AND IGNITOR

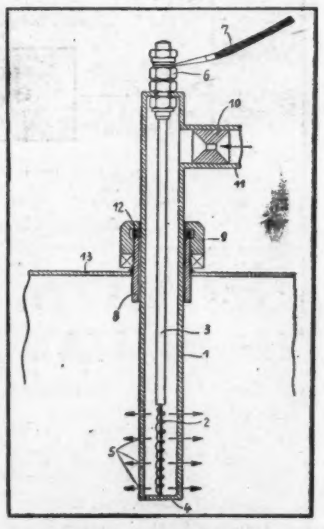
AN unobstructed constant flow of fuel to a glow-plug ignitor is claimed for the fuel-feed device described in **Patent No. 876,965 of J. Eberspacher, Germany.** intended primarily for air-heating equipment, burning a liquid-fuel/air mixture.

A fuel feed tube is slidably mounted in the heater combustion chamber, so that it extends partly into the chamber transversely to the direction of the air flow.

Inside the fuel feed tube, which is relatively long, is mounted a helical heater wire at the downstream end. This heater element is connected through an electrically conductive rod to terminals at the top end of the feed tube.

In the region of the heater element, the fuel feed tube is closed at its end, fuel vapour outlets being provided in the periphery of the tube.

The fuel is fed into the feed tube at the upstream end, near the electrical terminals, through a



PATENT No. 876,965

metering jet. Passing down the tube it is vaporised by the helical heater element, the vapour passing through the outlet openings to mix and burn with the air current passing though the combustion chamber.

PIPELINE IN THE SKY

Riddle Airlines Inc. are flying British turbo-prop Argosy air freighters up to 13 hours daily on the U.S.A.F. Logair routes. Logair is one of the world's largest scheduled cargo operations—an aerial pipeline for the quick supply of urgent military equipment. □ From coast to coast these new Armstrong Whitworth aircraft, with their special Rolamat quick loading systems, speed outsize military cargoes in their capacious holds, over a network of routes covering the U.S.A. Daily schedules bridge more than 12,000 miles. □ Soon, B.E.A. will be doing the same on their all-freight routes. Argosies will open up new high-speed supply lines for outsize cargoes between the U.K. and Europe. □ The Argosy is the only aircraft in the world with truck bed height double-end loading. Using the Rolamat cargo handling system, up to 13½ tons of bulky freight can be loaded swiftly through the full-width doors at each end of the 47 ft. long, 6 ft. 8 ins. high, 10 ft. wide fuselage.

This fast turbo-prop freighter offers:
To the manufacturer—large dimensions, minimum packaging, less insurance, negligible damage, high speed transit, less dismantling and reduced dispatch charges.
To the customer—quicker and cheaper delivery, reduced stocks and inventories, more positive supply schedules.
Transportation economics for machinery or other special equipment can now be considered at the early planning stage.

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A SUMMARY OF THE TRENDS IN TEXTILE FINISHING MACHINERY

Emphasis is on improving today's designs

by F. B. DIXON

THE fundamental principles on which machinery for bleaching, dyeing, printing and finishing textile fabrics are based have not changed greatly during recent years.

There have, however, been many mechanical improvements in construction and in the application of existing machinery to new purposes. These developments have usually occurred to keep pace with advances in chemical and technical practice as well as changing requirements of an increasing variety of fibres.

So, while there have been a few revolutionary techniques requiring new machinery, the chief technical demand in recent years has probably been for machinery in which special emphasis has been laid on the reduction of operating labour costs, higher output and reduced floor space.

This has led to the development of continuous processing ranges in which a high degree of automation is realised by means of grouping together several standard machines so that intermediate cloth handling is eliminated.

Electronic aid

The improvements in electronic control equipment and sensitive electrical drives have gone a long way in assisting the engineer to provide these improved facilities. They include automatic metering devices to control the feeding of processing liquor, meters for measuring the moisture in the cloth to ensure uniformity and optimum running speeds, and automatic synchronisation of electrical driving motors giving delicate control of the tension in the fabrics being processed.

Higher output can, of course, be achieved by designing machines which run faster, and developments in this direction have been made possible by greater understanding of bearing behaviour, investigation into the stresses set up in moving parts, and the availability of new strong but light materials for constructing moving parts.

Although higher speeds contribute to higher output it has also been realised that it is equally important to avoid unnecessary loss of production time in changeovers between different batches and considerable effort has been expended on the applications of ergonomics.

The rationalised grouping of machine controls and devices, such as cloth accumulators, which make continuous running possible, even between the end of one batch and the beginning of the next, continues to be improved.

A machine which has benefited from this approach is an engraved roller printing machine manufactured by Mather & Platt Ltd., of Manchester. Hydraulic loading has replaced the older weighted lever or spring loading, and remote control 'pitching device' embodying double helical gear wheels is now available.

This allows the pattern register to be adjusted by the operative while the machine is running at maximum speed and from a point where he can observe the fabric leaving the machine, something which was not possible in the days of orthodox 'box wheels'.

These two improvements have shown considerable saving in the time spent in setting up the machine when changing designs as well as enabling it to be run continuously at high speeds. Any adjustments to the pattern register can be made without having to reduce its speed.

One field of investigation by the engineer which has led to increasing machine speeds and reducing floor space required has been that of hot-air drying, and since, of all the basic processes carried out in the bleaching, dyeing, printing and finishing industry, drying of wet cloth occurs most frequently, it is of paramount importance.

By detailed study of the factors affecting drying, new theoretical concepts in the use of steam were evolved and corroborated by empirical work in the laboratory. There is now equipment available where the ratio of steam consumed to the water evaporated is 1.75:1 whereas until quite recently a similar ratio of 2.5:1 was considered good and 4:1 acceptable.

Considerable attention had also been paid to insulation and the prevention of heat losses by either convection or radiation while work on the possibilities of using other drying media such as fluidised solids or direct infra-red heating are being continually explored.

Of completely new machines designed to exploit new techniques a molten metal dyeing machine and a gearless, rubber-belt controlled compressive shrinking range are worthy of mention as examples of what can be achieved by close co-operation between the textile technician and the engineer.

The former, as the name might suggest, embodies the use of hot liquid metal as a means of impregnating cloth with dyestuff and its application has proved a most reliable method of maintaining evenness of shade as well as bringing all the advantages and economies of continuous processing to small batch production.

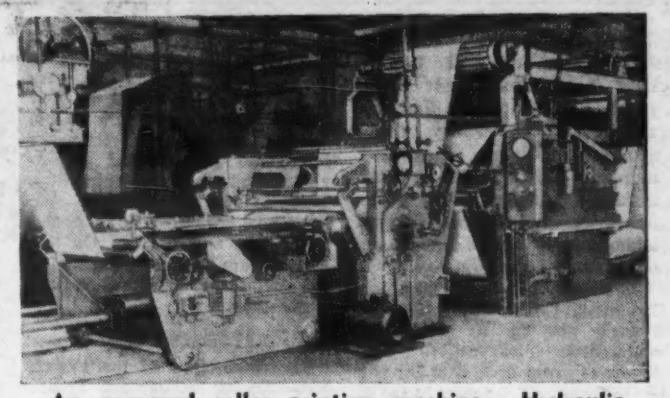
Accurate

The latter has been developed to preshrink cloth to a fine degree of accuracy before sending it to the manufacturers.

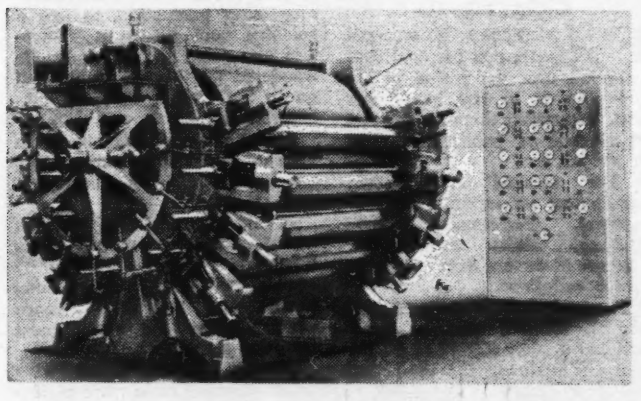
Developments in textile technology have not always led to such easy and economical solutions from the engineering point of view. In some cases chemicals which are highly desired by the textile chemist have undesirable effects on normal engineering materials and it is necessary for the engineer to go outside the range of materials within which he normally works.

A fair conclusion to draw from the study of recent developments in textile bleaching, dyeing, printing and finishing machinery is that there has been more emphasis on the critical rationalisation of standard equipment with a view to reducing operating costs and facilitating control of uniformity than the fundamental designs of new machines.

This has led to the increasing use of specialist equipment from proprietary manufacturers, and the textile machinery manufacturer being continually on the look-out for control equipment, often designed to suit other industries, which can be adapted to the industry he serves.



An engraved roller printing machine. Hydraulic loading has replaced the older weighted lever or spring loading.



A gearless, rubber-belt controlled, compression shrinkage range — a new machine designed to exploit a new technique.

AUTOMATIC CONTROL OF PLAIN AND PURL

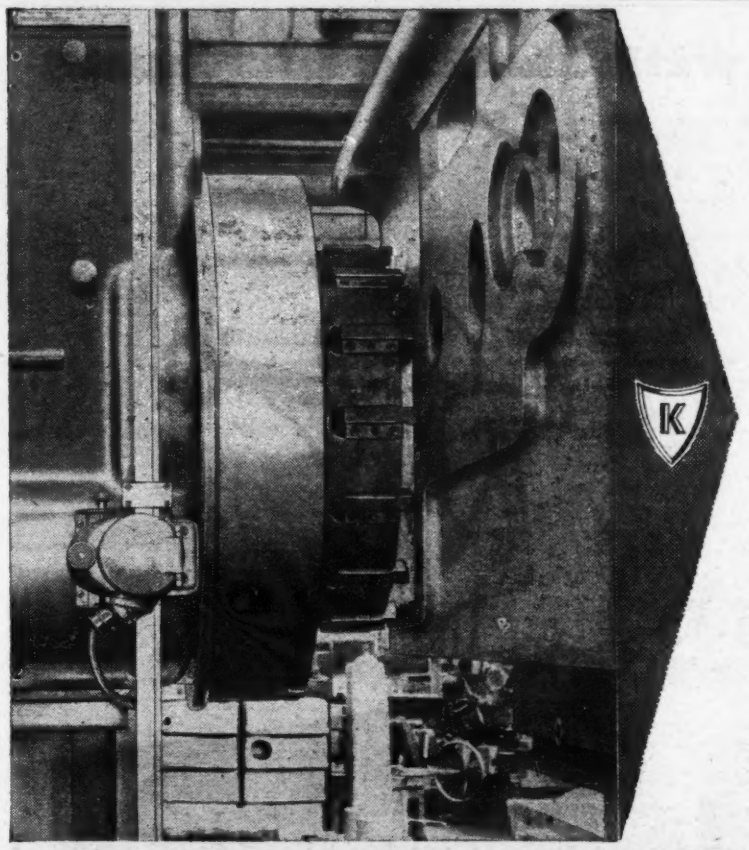
THE IMPACT of fashion demands on the most recent knitting machinery is clearly shown in the number of seam-free hosiery machines to be displayed at the Textile Recorder International Knitting Machinery exhibition in Manchester next week (October 11, 12).

Eighteen companies from Britain, the U.S., and Europe are showing single and multi-feed seamless hose machines, several of them units not previously seen in this country.

Automatic control has advanced among the fully fashioned machines. One such machine will be shown with card control, and the first fully automatic fashioned rib machine will also be at Belle Vue.

The first model of a four-feed seamless hose machine operating without reciprocation and producing a stocking in 2¼ minutes will be introduced by the Singer-Fidelity Company, of Philadelphia, U.S.A. Fitted to this machine is a device for the automatic discharge of each stocking from the machine.

At least two 44 feed machines will be shown.



KEARNS

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A No. 3W.B. Kearns Patent Horizontal Surfacing, Boring, Milling, Drilling and Tapping Machine, equipped with Microptic Optical Measuring, with a 20" dia. face milling cutter, machining the end of a bed casting. Depth of cut ¼". Feed 10"/min.

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NEWS FOR YOU
IN 'WIGGIN NICKEL ALLOYS' NO. 62

Send for your copy of this free periodical which regularly features articles illustrating engineering applications of High-Nickel Alloys.

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* *Rover's new turbo-prop for light aircraft*
* *NIMONIC* alloys in the HSBT CLARK Industrial Gas Turbine*
* *Bristol Siddeley Aero Engines and Wiggin heat-resisting alloys*
* *Corrosion-resistance of nickel/chromium plating*
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FRANCE

Opportunities for Britain within the Common Market

THE Common Market challenge to Britain's engineering industries is the biggest single issue since the war.

Engineering News presents a survey of Britain's prospects in a weekly series of five articles. This week's report is from France; next week's is on Italy; then W. Germany, Belgium and Luxembourg, and Holland.

Two big changes and Britain could reap greater profits

ENGINEERING NEWS sends its Industrial Editor-J. D. F. Perry to report from inside the COMMON MARKET. . .

IN a few weeks the French authorities will publish their next Four Year Plan, (1962-65). The picture that will emerge of a swiftly rising standard of living, of growing industrial output and investment is full of promise for the home industries—and for the foreign manufacturer who intends to share in this activity.

If Britain joins the European Economic Community while the French are in a period of enthusiastic expansion (the favourite guess at a date for the British entry is January 1, 1963), then our chances of selling more across the Channel are good — if two big changes are made first.

*

BOTH of these — fundamental revisions in the way the U.K. tends to look at the French market — were crisply outlined to me by an industrial executive in his office high above the squealing brakes of the Paris traffic.

Laying down his American-made pen, this frequent visitor to Britain, explained: "France is not Paris alone. The representative who comes only to Paris misses large areas of the market. That is one thing and it is very important. The second is your way of looking at us as a nation.

"You still seem to retain the impression of changing governments and financial instability. This is long out of date. We have now enjoyed a long period of stability and growth. On this basis we are vigorously expanding our engineering industries and the whole economy."

Provinces too

The importance of the French provinces as markets for British products can hardly be overstressed. Under the old system of import restrictions whatever was imported tended to go to the Paris area and stay there.

During the next four years somewhere between 700,000 and 1,000,000 new workers will join French industry which now employs about 19 million. As many as possible of those new jobs will be in the provinces.

How far do British manufacturers understand the way in which French industry is advancing outside Paris?

I was told the story of the sales director who arrived in Paris for a personal check on the possibilities. The first question he was asked was which provincial centres he would be visiting.

"They're lucky to get me as far as Paris, I'm not going any further," was the swift answer.

While it is true that Paris contains the headquarters of most of the trade associations, and these are useful contacts for the company wanting to make its way into the market, the opportunities for seizing a larger share of sales from the West Germans and the Italians are further afield.

I was repeatedly told that in important areas of the country Britain is not understood as a manufacturing and exporting nation.

"There is little reason why this should be so," I was told by a French importer. "Our trade has been widely liberalised. It is a matter of going where the markets are and making known what you are trying to sell."

In 1960 the total import bill into France was £2,264 million and Britain's share of this was 4.3 per cent. Purchases from the U.K. were equal to £2 a head.

It would be an oversimplification to say that every British salesman who decides to go on from Paris to the big provincial centres will at once start the sales graph soaring.

While much of the country regards Britain as highly as ever, it does not occur to people to think of the U.K. as being as keen to export as their partners in the Common Market.

Despite the export to France of aircraft engines and spares worth more than £10 million last year, the British export most commonly spoken of is Scotch whisky.

Companies wanting to make a start in the French market will find the commercial section of the British Embassy extremely helpful. Address—35, Rue de Faubourg, Paris 8.

Greater attention may be paid to this famous export line, and to top quality textiles, but it is in the engineering industries' field that some of the best hopes for developing Anglo-French trade now lie.

Rising imports

FROM what has so far emerged it appears that personal consumption over the period of the new Plan is to rise by 20 per cent. Supporting this will be a rise in the rate of public investment of 40 per cent.

The demand for capital equipment for industry will be intense. Performance and delivery dates are more important factors than marginal price variations.

From 1951 to 1960 an average annual increase in the gross national product (GNP) of 4.2 per cent was attained. For the period of the Fourth Plan the GNP is expected to rise by 5.5 per cent each year.

While the French economy has plainly generated a powerful momentum of its own, rising production and exports will be accompanied by a rising import bill.

Where will these imports come from? The machine tools industry is a good example.

All-round rise

In the next four years the machine tool industry will be raising its level of investment six per cent each year. Both imports and exports will rise by about 25 per cent by 1965.

Twelve per cent of all the machines and equipment bought by French industry last year were imported. Britain's share in this was a modest 13 per cent.

Part of the U.K.'s share was made up of non-electric machinery worth £9 million, machine tools worth £1,600,000 and office machinery valued at £1,400,000.

Even a slight improvement in Britain's share of the market will mean much larger orders.

*

BUT time is running out and there are two special factors working against us of which I have been constantly reminded.

The first is perhaps as important as the successive stages of tariff lowering. It is the swiftly changing pattern of inter-European technical and trading agreements between companies.

Promising far reaching rationalisation as they become more effective, these over-the-borders arrangements are not expected to reduce employment. Rather the trend is for the concentration on particular plants of what can be best and most cheaply produced.

The economy in production costs and the improved standards of closer specialisation are obvious.

The second factor, bearing particularly on British machine tool exporters, is one of reputation. British machines have a high reputation. They invariably do what their makers claim for them, often with a more comfortable margin to meet operating conditions than competitors' products.

Right tools

Why then have European competitors been pushing strongly into the market? The answer is that it is the United States and Western Germany who have the reputation for providing the highly sophisticated tools and systems needed to keep up with the growth of consumption, investment, and exports.

England does not seem to the French to be an engineer's country.

In a comfortable restaurant near the Seine a French executive brought his son into the conversation. The young man, with his father's proud support, was planning, after graduation, to join a machine tool company. There was one doubt in his mind. He wondered whether he should first go to the United States to gain experience.

French industrialists appear to have no doubt that training more and better qualified engineers is a national priority.

In the long-term the ways in which the member-countries of the European Economic Community educate and employ their young people will strongly influence which country will benefit most from the association.

In more immediate terms I have heard these main complaints about British representation in France.

Too many firms still insist in tendering in pounds, shillings and pence, and feet and inches. The first of these seems to arouse much more indignation than the second.

Too many firms write in English and expect replies in English as well.

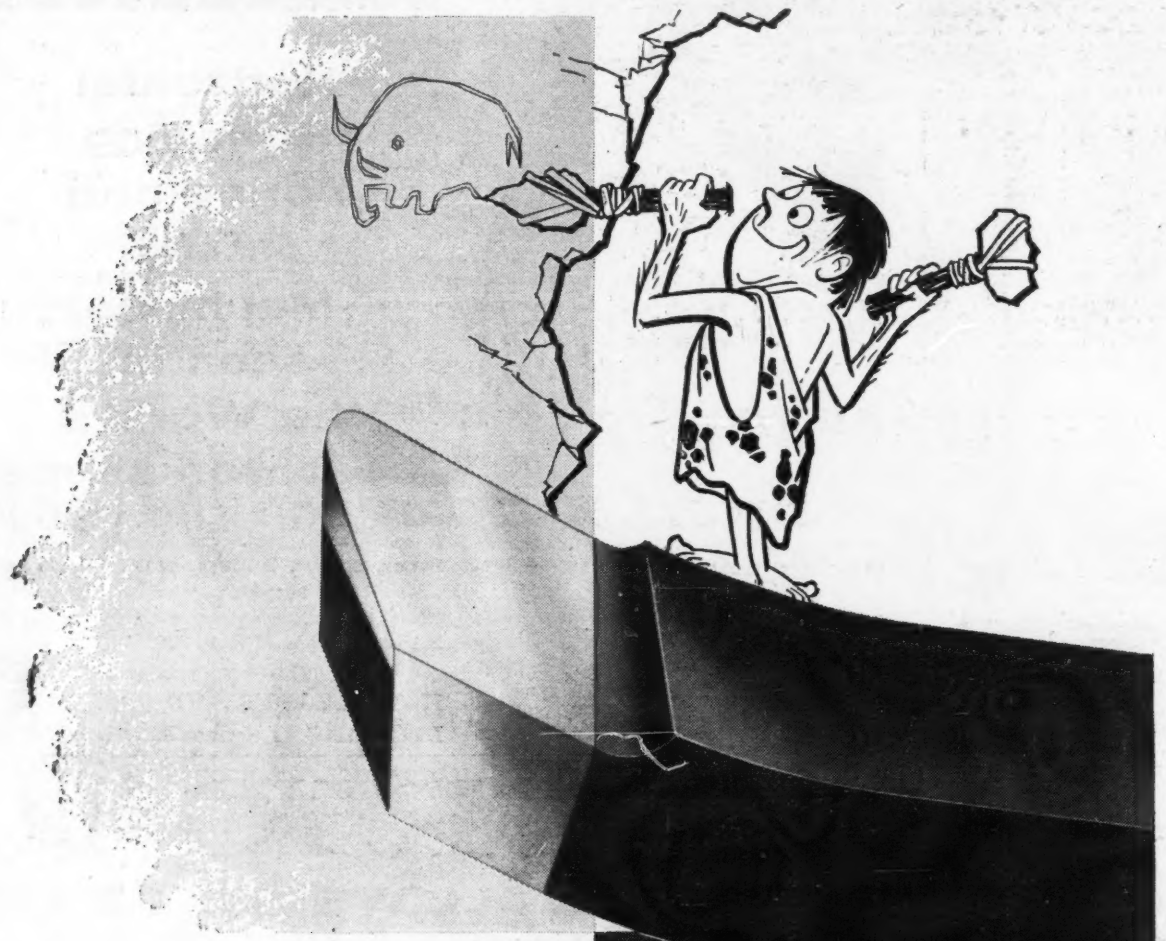
Too few engineers and senior executives make personal visits and too few of those that do speak French.

Summing up

Conclusions: Given vigorous representation on the spot British industry can make up a lot of lost ground in selling to the French consumer and in a much larger contribution to industrial capital investment.

Based on many inter-firm agreements on research and production policies the competition will be sharp and of high standard.

A cutting end with lasting hardness



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TOOLS

WITH the eyes of industry focussed on the export market, it has become evident in recent months that international standardisation will undoubtedly be instrumental in establishing greater unification between standards published by the national organisations of the member countries of the European Free Trade Association (EFTA) and the European Economic Community (EEC), also known as the European Common Market, thereby increasing the prospect of international trading in Europe.

WORLD STANDARDS

ORDERS: The Common Market needs to have unified specifications

DURING the post-war years, the International Electrotechnical Commission (IEC) and the Internal Organisation for Standardisation (ISO), which created a secure unification of standards, have established throughout the world a sound foundation for the development of international trading.

The ISO which claims a membership of 444 national standards bodies, including those from countries represented in EFTA and EEC, has, through the activities of approximately 100 technical committees, published nearly 200 recommendations on subjects relating to the aircraft, chemical, coal, plastics, rubber, shipbuilding, steel and textile industries; mechanical handling, instrumentation, mechanical engineering, and nuclear energy.

The British Standards Institution, as a member body for the UK, are represented on nearly all the ISO technical committees, and in ISO alone hold no less than 23 secretariats of the more important committees.

The remaining secretariats are divided between France, Germany, Netherlands, and Belgium, with other countries holding one or two secretariats.

Valuable support

The participation of the UK in this work places a heavy demand on the BSI, and also on industry whose support, both financially and in providing delegations for international meetings.

The export panel of the BSI, in a report published this year, has drawn the attention of industry to the need for full and active participation in this work and in increased financial support on a much larger scale to enable International Standardisation to succeed in its objective.

The export panel also stresses the need for authoritative delegations from the UK in order to gain international acceptance of recommendations made by ISO.

One of the major problems being tackled by the ISO and the IEC is dimensional standards, and in particular the interchangeability of products manufactured to inch and metric dimensions

The principle generally accepted is that ISO technical committees should seek agreement on the following possibilities:

- **a series of sizes expressed in one system of measurement only:**
- **a series of sizes derived from one system and expressed in both by exact translation;**
- **a series of sizes obtained by a selection from existing sizes, some in metric and some in inch practice;**
- **a dual series of sizes in which interchangeability is achieved between sizes expressed in inches and millimetres, though the series have not identical dimensions in all respects; here, designation is important to show which are the interchangeable items.**

Of the many subjects covered by ISO, mechanical handling has received considerable attention from several committees. It is essential in international trading to agree on unit sizes for transporting and packaging, to facilitate economic loading.

The technical committee responsible for the standardisation of dimensions of pallets (used for transporting goods either as single units or multiple units), has achieved considerable success in reducing them to three sizes acceptable for road and rail transport and two sizes for shipping.

The adoption of agreed tolerances on the dimensions of the pallets, which are available in both inch and metric dimensions, allows for the interchange of pallets between countries, particularly in Europe.

Recent developments in this field have seen the setting up of two more ISO technical committees, dealing with packaging dimensions; and freight containers, the first meeting of which was held recently under the secretariat of the United States.

Here again is evidence that agreement by European member bodies of ISO in producing recommendations, is helping to unify standards between the EFTA and the EEC.

To avoid the setting up of independent groups throughout Europe agreement, initiated by the European Common Market, was reached for the two groups to collaborate on implementing recommendations of ISO and IEC.

Earlier this year a new non-electrical committee known as the European Standards Co-ordinating Committee (CEN) met in Paris at the invitation of the French Standards Organisation to select subjects for study which are most vital to European trade.

With the work of ISO growing steadily from year to year and the entering of more nations into International Standardisation and also the movement towards greater unification of European standards, the challenge to industry should be accepted to the full if the UK is to play its part in this work.

INTO HISTORY

AN oxygen cutting machine, bought by a Wolverhampton firm in 1924 for £43, and which has been in constant use for 37 years without replacements of any kind, was presented to the Birmingham Museum of Science and Industry this week.

The presentation was made by Professor E. C. Rollason, of Birmingham University on behalf of the makers of the machine, Hancock & Co. (Engineers) Ltd., of Croydon.

Pictured right, Professor E. C. Rollason cuts out his initials from a ½in. steel plate.

U.S. REDETERMINES RESISTANCE UNIT

THE primary unit of electrical resistance maintained by the U.S. National Bureau of Standards of the U.S.A., has been redetermined by a new, more accurate method.

The evaluation is based on a nominally 1pF capacitor, the value of which may be calculated to a high degree of accuracy from its mechanical dimensions.

Measurements made by a group under the direction of R. D. Cutkosky using the new method indicate that the N.B.S. unit of resistance is 1.0000023 ohms with an estimated 50 per cent error of 2.1 parts per million, based on the statistical uncertainty of the measurements, and allowing for known sources of possible systematic errors other than in the speed of light, assuming that this is 2.997925×10^{10} ms.

Because of the need in modern science and industry for precise electrical measurements, the Bureau permanently maintains basic primary standards of voltage and resistance from which other electrical quantities are derived. The national standard of resistance is maintained with a group of 1-ohm manganin resistors.

The values assigned to these resistors are calculated from extremely precise measurements made in terms of the basic mechanical units of length and time. Such measurements, which must be periodically repeated, serve to fix the relation between the electrical and mechanical units.

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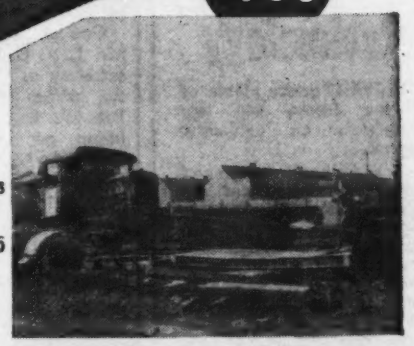

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ENGINEERING NEWS

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Thursday, October 5, 1961

Crucial days

THERE is plenty of evidence that the British engineering industry needs rousing if it is even to hold its present position in world markets, let alone expand.

In spite of figures which show that the industry has recently increased its output, there are ominous signs that the long-term position is unhealthy and the next five years will be crucial ones in which a gigantic effort must be made to catch up on technical development, as well as on efficient sales and management.

☆

At its best, British engineering is still as good as any to be found in the world, and products such as aircraft engines, and research projects such as the Hovercraft, show that when we really put in the effort, the results fully uphold the great tradition which British engineering established in the 18th and 19th centuries.

Unfortunately, these "peak" efforts are not typical of the average level of engineering activity in the industry. Far too many companies are content to carry on their businesses unchanged from generation to generation, perpetuating the mistakes of the past and ignoring the future.

Engineers abroad are no longer looking to Britain for new ideas but, on the other hand, too many British firms are searching out foreign designs to manufacture under licence in this country.

☆

Direct competition with Common Market manufacturers is certainly going to show up any inefficiency, but our entry into the E.E.C. will only hasten a situation which will inevitably arise, whatever the outcome of the present talks. We need a more active outlook on research and development, more capital made available to finance long-term projects and automation and a more determined policy to avoid unnecessary strikes.

Tomorrow's technology

ELECTRIC power plants of the future will rely completely on automatic control.

While heat rate and reliability improvement are certainly factors in justifying automation, the real economic justification lies partly in the elimination of manual control apparatus and partly in the reduction of the cost of generating equipment designed for strictly automatic operation. This implies that the power plant of the future will have provision for automatic control and will rely on it completely.

There are a number of economic incentives for automatic control, notably increased reliability, improved operating efficiency, and more productive use of manpower.

However, behind each economic incentive is the growing complexity of steam power apparatus. This has made it imperative to replace the human operator.

An Engineer's DIARY

MR. NAYLOR'S GREAT DAY —THANKS TO TELEVISION

OF all the claims to fame that a company may enjoy one of the rarest is still that of having been set on its feet by success on the television screen.

Richard Naylor and Edgar Marlow were already on their way as part-time high precision platers when Naylor reached a competitor's place in the late News Chronicle television competition in 1956. His ideas were good but that time he lost.

A year later he was back, and this time he won. The prize, with Sir Miles Thomas, former BOAC chief, now chairman of Monsanto, on the panel, was £3,500 and the money went into forming the Coventry firm Precious Metal Depositors.

Talking with Mr. Naylor at the official opening, performed by Sir Miles Thomas, I gained a strong impression—that £3,500 helped, but he would still have made it somehow, sometime.

SIR MILES THOMAS (right) sat on a TV panel which awarded Richard Naylor £3,500 in 1957 for his ideas and determination to set up his own electro-plating firm. Last week Sir Miles officially opened the Coventry factory of Precious Metal Depositors, of which Naylor is managing director.

A MIRACLE

BIOLOGICALLY, it's a miracle, said Lord Brabazon at the Roadfarers lunch on Friday, describing the success of Sir William Lyons in exporting prestige as well as cars.

"How a family of Lyons can give birth to so many Jaguars beats me". He said all Britain basked in the success of the "Jaguar" story. This is, in fact, the title of a new book written by Lord Montagu to commemorate the contribution made to motoring history by the Jaguar company.

Sir William had some poignant remarks to make about the vital need to keep down production costs, and the impossibility of doing this when hampered by labour strikes.

He is the third big industrialist I have heard this week who has made this point.

MOON - REACHING

I DO not suppose that many engineers were excited by the news that on Sunday a strong delegation from the British Interplanetary Society left London to attend the 12th International Astronautical Congress in Washington.

"Reaching for the moon" is not usually the way to get on in practical engineering. However space research may well supply answers to some of the tricky problems in our more earthy activities.

One of the British delegates is Mr. L. J. Carter, the enthusiastic secretary of the B.I.S., and he is the prime mover in mounting Britain's first International Exhibition of Space Research and Technology, to be held at Olympia in May 1962.

It will be run as part of the Power Generation and Clean Air Equipment Exhibition and the theme of the two exhibitions will be the relationship between industrial power on earth and the exploration of space.

IRISH PROSPECTS

BIRMINGHAM industrialists with a hankering to spread their interests into Ireland have the chance of first-hand advice this week without going further than the Queen's Hotel.

Mr. Gerard Bryan MacCarthy, a 28-year-old barrister who is now permanent representative in Britain of the Eire Industrial Development Authority, is spending the week in the city expounding the advantages of manufacturing in Eire for world markets.

Before his new appointment, announced last month, Gerard MacCarthy had picked up almost as much knowledge about Europe and the export markets as the conditions of his home country during overseas missions as European director for IDA.

For two years before taking up that post in 1958 he had been foreign trade adviser to the Irish Export Promotion Board.

The Industrial Development Authority has the job of promoting the establishment of firms from overseas in Eire. It follows that their outlets will be abroad.

Plentiful labour, a ten-year tax holiday, and outright cash grants for buildings and machinery are among the inducements.

PRIDE OF PLACE

PRIDE of place among some distinguished last-century telescopes in the British Science Museum has been given to a model of the Jodrell Bank radio telescope.

The model was presented last week to Mr. David Follett, director of the museum, by the United Steel Companies whose United Steel Structural Company built the original telescope.

CIVIL ALLOYS

MANAGING directors who feel that the public have not completely understood what their company is doing are not exactly rare.

Corrective explanations are liable to ramble on, but one managing director with a clear, crisp view of his firm is Mr. H. W. G. Hignett, of the high-performance special alloy firm Henry Wiggin.

Mr. Hignett puts it simply. The company produces materials for a sophisticated civilisation.

"It is a terrible fallacy to think we depend for our main business on producing materials for military purposes, "he explained at a recent conference for twenty overseas agents at the company's Hereford factory.

Already selling more materials for civil aircraft than for military, the future of the company is closely bound up with rising living standards.

"We would like, for example, all the population of India to demand more hospitals, more washing machines, electric irons and television sets."

This hope for the future may overleap mundane questions of payment but it strongly suggests that when labour-saving devices do reach the vast markers of Asia, Mr. Hignett will be in there with even wider civil application of specialised alloys.

John Heywood

VIEWPOINT

REPLYING to the toast "The 1962 Exhibition" at the Electrical Engineers' ASEE Exhibition dinner on Thursday, Sir William McFadzean reminded exhibitors that if at any time they felt weary or depressed they should remember:

In the English dictionary the word coming immediately before "exhibition" is "exhaustion" — on the other hand, the word that follows is "exhilaration".

SOVIET ENGINEERING
by our own correspondent

Metal works to be computer controlled

MUCH has been made over the last five years of Russian claims to have built automatic piston and ball-bearing factories; the claims proved to be well founded only if the definition of an automatic factory be extended to shops containing automatic transfer lines not subject to overall computer control.

Plans for a computer-controlled automatic factory, in this case a metallurgical plant, appear however to be well advanced.

Details of the project are given in an article, written by Dr. K. P. Kostenetskii, included in the current issue of "The Mechanisation and Automation of Industry".

The author describes two alternative projects designed by the Mechanisation Section of Gipromez of an automatic metallurgical plant.

The first scheme is based on the use of existing high productivity metallurgical units and the second on a new type of continuous action unit.

Descriptions of the various stages involved in the automation of the open-hearth process are included, and a block diagram shows the scheme for the overall computer control of the plant.

✱

A PLEA that greater use should be made of mathematical methods and computers in the planning of the work of engineering enterprises in the USSR has been made by Professor O. Kozlova.

It appears that the Laboratory of the Economics and Organisation of Production attached to the Moscow Engineering-Economic Institute is working on the application of Mathematical methods to the operations-planning routine of the First State Ball Bearing Factory.

In those shops where output is not limited by the demands of the national economy or by special instructions, the maximum loading of the machinery will serve as the optimum criterion.

✱

A RECENT article in "Pravda" under the title "Thermo-Nuclear Reactions can be controlled" reveals that apart from the Kurchatov Atomic Energy Research Institute in Moscow, four other institutes are also working on this problem.

They are the Leningrad Physico-Technical Institute, the Ukraine Physico-Technical Institute, the Physico-Technical Institute of the Academy of Sciences of the Georgian Republic, and Moscow State University.

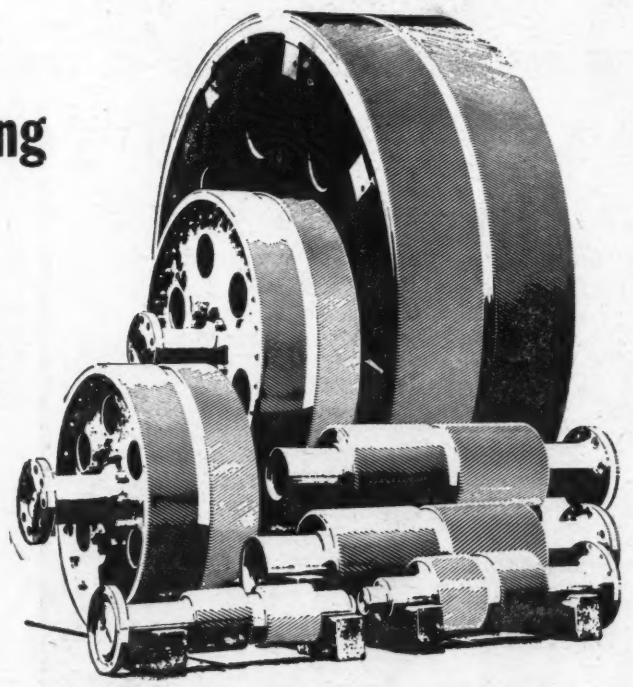
The author of the article says that they are on the way to solving the control problem.

The research workers at the Kurchatov Institute are apparently working with two kinds of magnetic chamber for controlling plasma, the "Ogra" and the "Tokamak".

The first is an extensive tunnel stopped up by magnetic reflectors. Particles are accelerated into the tunnel. They are disintegrated, producing a high temperature plasma.

It is stated that so far only the simplest magnetic field configurations have been investigated in any detail, but that the virtue of the Ogra lies in the fact that its solenoids are sectionised and the experimenter can, therefore, combine diverse magnetic fields. The second is rather like Zeta.

gearing for ships



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PUNCHED CARD MEMORIES FOR ROLLING MILL PROGRAMMES

AN automatic programming system for steel rolling mills, using punched cards to store rolling programmes has been developed by the Metal Industries division of English Electric. The complete sequence for the operation, screwdown, manipulator, mill speed settings and the number of passes for the operation can be stored.

The system is said to be an advance on the uniselector system introduced two years ago as it offers larger programme storage capacity than can be economically obtained with uniselectors.

Three basic units are employed: a card store, a card punch, and a card reader. The cards themselves are of 1/32in. thick plastic, and can be supplied in nine different colours.

Keys are checked

The card punch is hydraulically operated, and the keys remain depressed so that they can be checked before printing each line.

All the information necessary for one pass of the mill can be stored on a double line on the card. This avoids the need for an intermediate memory store, since the pass information remains under the reader for as long as it is required.

The sensing devices are phototransistors, the output from which is amplified by transistors to control small plug-in relays. The relays operate the various position control systems.

All components except the relays are mounted in standard plug-in Datapac units of the printed circuit type.

A card can be advanced through the reader either by single passes or as a complete rolling operation.

After completing the programme the card is reset automatically to be used again or rejected as required. The operator can take over manual control at any stage to correct rolling faults.

Prototype demonstration at Californian laboratories

ION ENGINE ROCKET DRIVE

Advance version may power manned space flight to Mars

AN experimental engine, described as the "ultimate" in propulsion devices was recently shown in operation at Hughes Aircraft Co's laboratories, Malibu, California.

A more advanced version of the engine will be ready for flight test next year, and developments could eventually send a manned spacecraft to Mars at a speed of 83,000 miles an hour.

Present plans are for an initial space test in late 1962, and a complete ion propulsion system including a nuclear-electric power supply as early as 1965. Compared with a conventional chemical rocket, the ion engine requires 20 to 30 times less fuel per pound of thrust.

NUCLEAR ENERGY CONVERTED

The primary source of energy for the engine in outer space will be a nuclear reactor, the energy from this is converted to electricity through a heat-exchanger and electric generator. The propellant used is cesium, because cesium atoms are most easily converted to ions.

Propellant is stored in a reservoir from which cesium vapour is diffused through a hot tungsten element. This ionizes the cesium by a process known as contact ionisation.

Ions are accelerated to a high exhaust velocity by a system of electrodes to which voltage is applied.

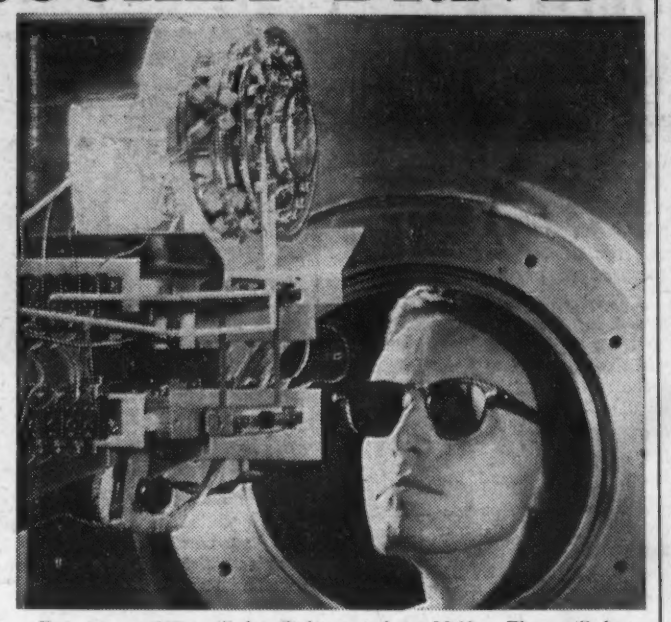
The high velocity ion beam passes through a neutraliser region where electrons are injected into the ion beam to provide space-charge neutralisation of the electric field.

The ion engine is much closer in design and operation to an electron tube than the more conventional chemical or nuclear engine.

This engine cannot boost a space vehicle from the earth due to the low thrust, but after escaping the earth's gravitational field will be able to generate the velocity required for long space flights.

FOOTNOTE:

The theory of electric propulsion is not new. Dr. R. H. Goddard, American rocket pioneer, mentioned in 1906 the possibility of accelerating electrically charged particles to high velocities without the need for high temperatures. Twenty three years later Prof. H. Oberth devoted a chapter in his book, "Possibilities of Space Flight" to the various problems of electric propulsion systems.



Two ion engines will be flight tested in 1962. They will be incorporated in a Scout rocket, planned to reach an altitude of 5,000 miles, for demonstration in space conditions.

Enlarged test lab for new switchgear

SPECIAL equipment necessary to test the latest circuit breakers is being installed at the English Electric Nelson High Power Laboratory in Stafford.

Electricity consumption doubles every ten years and to help meet this demand English Electric commenced developing a new air blast circuit breaker in 1957. This is suitable for voltages up to 650 kV with current ratings up to 4,000 A and a short-circuit rating up to 50 to 60 kA and very short total break times. It is considered to be the world's most advanced design.

The existing test plant capacity is being doubled by adding two new alternators together with associated transformer banks and full ancillary equipment with a capacity to test up to 600 kV.

New features in the plant design include the provision of servo controls for the synchronisation of four machines and the use of pressure immersed make-switches each having a making capacity rating of 300 kA peak.

DESIGN LAG BOOSTS CONSUMER COSTS

THE cost of gas in Britain is between three and five times as high in some European countries. Fuel oil prices are double those at some continental centres and solid fuel prices are 50 per cent higher than those of the US.

This position, partly due to lagging in the design of heat generating and distributing equipment, was outlined by Dr. F. M. H. Taylor, president of the Institution of Heating and Ventilating Engineers, in his address to the first International Conference on heating, ventilating and air conditioning, held in London, which ended yesterday.

Value of heating

Dr. Taylor went on to say that it was not easy for the general public to understand the value of heating, ventilating and air-conditioning technology; to appreciate how much we already depend on this technology for comfort, health and, sometimes, life itself.

The theme "administrative advances likely in the next 10 years" was covered by seven papers.

Mr. N. S. Billington, director of the Heating and Ventilating Research Association, in a paper, "The Next Decade, and After," said electrical energy would eventually be used exclusively for heating and ventilating systems, and that solid fuel would disappear from the market. It would be displaced by oil and gas.

He said heating and ventilating systems themselves would gradually be replaced by air conditioning, although high velocity air systems, as at present conceived, will continue to be used.

Developments are also taking place for providing dwelling houses with combined air heating and ventilating systems.

Cooled ceilings

An interesting paper presented by Mr. G. Werner, Denmark, called "Air-Cooled Ceilings for Heat Absorption," gave details of a development in air conditioning which is growing in favour in Denmark.

This research has emphasised the interesting possibilities to be found in using cooled ceilings as components in air conditioning systems.

Other contributions on training and education, contract planning, costing, the organisation of site operations, and the sources and use of finance for research, were presented by scientists and technologists from France, Germany, Poland, Sweden, the U.S.S.R., and the U.K.

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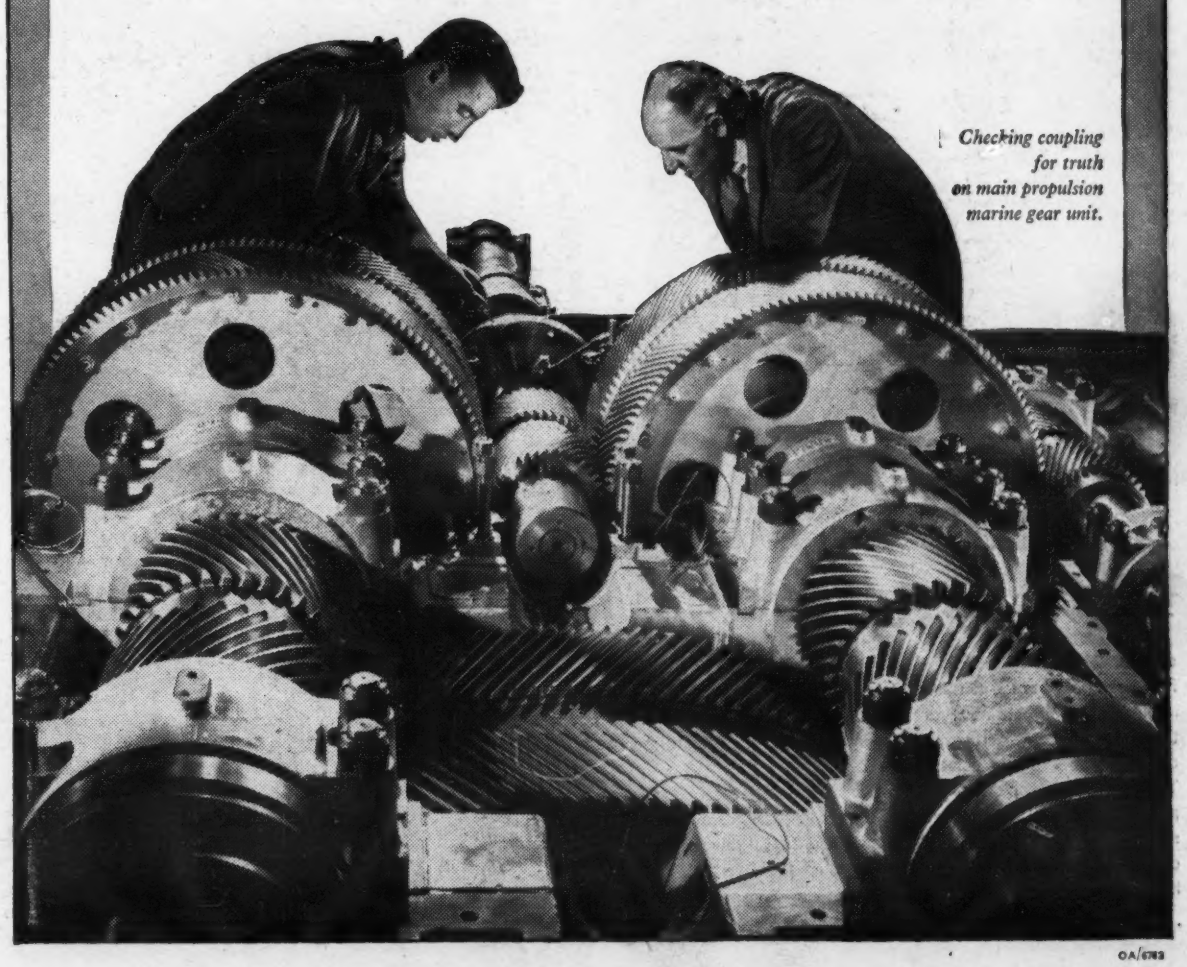

Checking coupling for truth on main propulsion marine gear unit.

OA/6783

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FOREIGN NEWS . . . . . FROM OUR OWN CORRESPONDENTS

Chrysler jet-car will run on any liquid fuel

DETROIT

AN experimental car with gas-turbine engine, air-flap brakes for use at high speeds, and retractable headlights, has been announced by Chrysler International, the export division of the parent company in the U.S.A.

A spokesman stated that the new car can operate on "practically any liquid fuel that will flow through a pipe." This includes petrol, paraffin, and diesel oil.

Called the "Turbofite," the car is on display at the Paris Motor Show, which opened today.

The gas-turbine engine has an output of 140 h.p. at 39,000 r.p.m., and weighs 450 lb. It occupies a space of 27 by 27 by 25in.

The Chrysler engineers claim to have solved the problems of producing a gas-turbine engine with high rate of acceleration and improved engine-braking.

Ceylon mill: aid by USSR

COLOMBO

STAGE One of an iron and steel project being set up in Ceylon is a rolling mill capable of producing 35,000 tons a year of light and medium sections from 40,000 tons of imported steel billets.

The initial capital will be about £6 million. It is planned that products from the mill will be sold at a net profit of £75,000.

Technical and capital assistance is being provided by the USSR.

Franco-Dutch Aircraft Deal

PARIS

THE Louis Breguet company of France and Fokker of Holland have concluded an agreement under which Breguet are to have an important share in building the twin turbo-prop Fokker Friendship aircraft.

The French company's contribution will be mainly devoted to construction work on the fuselage.

Brno shows new ideas in machine tools

One machine constantly surrounded by interested spectators at the Brno Trade Fair was the SK 25 vertical borer, left, with a TV installation for internal work. In the centre is shown the WKV 100 jig borer for high-accuracy prototype work, and right is the FV 100 vertical mill without knee.

Automatic control emphasised at Czech trade fair

PROGRAMME control systems were incorporated into more than 25 per cent of the exhibits in the machine tool section of the Third International Trade Fair at Brno recently. Emphasis throughout the section was on automatic operation.

Infinitely variable control of spindle speeds was provided on all but the simplest machines. Infinitely variable feeds were often incorporated.

An example of the trend towards infinitely variable speeds is to be found in the SK 25 two-column vertical borer, with spindle speeds variable over a ratio of 100:1.

Work speed can also be automatically adjusted to give constant cutting speeds during facing operations, and Selsyn gauging devices are fitted to both horizontal and vertical slides for precision machining.

A wide range of equipment is available for this machine, even including a TV installation for internal work. There is also a copying attachment and equipment for taper turning and thread cutting.

Maximum turning diameter is approximately 100 in. and maximum weight of workpiece 10 tons.

The WKV 100 jig borer, with one vertical head and a horizontal headstock, has been designed for high-precision work in prototype production where the expense of fixtures would not be justified.

A particular feature of the machine is that it can cut a large range of threads, including taper threads, without ancillary equipment. Table clamping area is approximately 63 in. by 40 in., and once again there are infinitely variable feeds.

A semi-automatic lathe with electro - hydraulic programme control, AB 63, is set up without cams and for some jobs a loading attachment can be used, giving a fully automatic cycle.

Front and rear saddles have hydraulic feed mechanisms and a hydraulic copying attachment is available. Different operating cycles are selected by the adjustment of distribution valves.

Swing over the bed is 20 in., over saddle 10 in., and maximum turning length is 26 in. Spindle speeds are from 45 to 2,000 r.p.m.

No-knee mill

The FV 1000 vertical mill has no knee and is intended for heavy workpieces of complex shape.

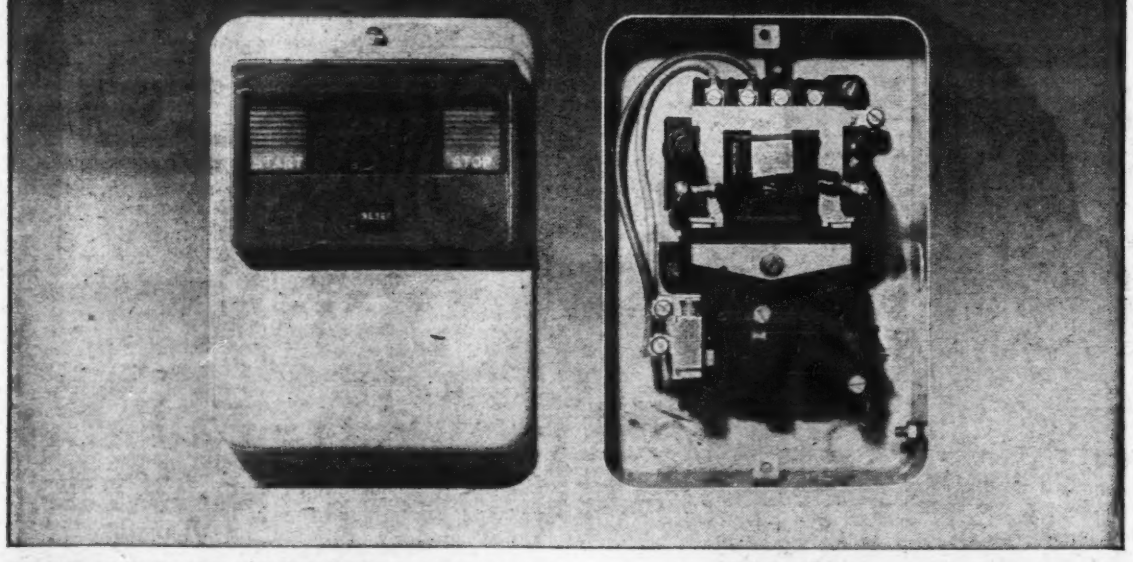
Spindle drive is from an asynchronous motor with 24 speeds available and feed rates are infinitely variable. Clamping area of the table is 40 in. by 124 in. Maximum work height is 31in.

Prominent among the gear checking machines is the IMO 32, which makes use of sine curves recorded on magnetic tape. Spur, helical and worm gears can be checked for kinematic, additional and cyclic errors and discrepancies of ½ second of arc can be detected.

The measuring system is said to offer considerable advantages in terms of flexibility and accuracy over other methods.

Included in the exhibition were two complete automatic production lines: one for machining diesel engine cylinder heads, the other for producing 3mm. bolts.

DOC 80
A SUCCESS
FROM THE START



THE DOC 80 MOTOR STARTER

designed and produced by AEI and launched in March this year, was featured prominently at this year's A.S.E.E. exhibition. It quickly proved itself a winner, and is now going from success to success . . . . So much so that we have already taken steps to increase our manufacturing capacity in order to meet growing demand!

This unique 5 h.p. direct-on-line contactor starter offers single-phasing protection at a new low price. *Interchangeable heaters* permit a single starter unit to meet any of 15 different current rating needs—an outstanding design idea that greatly simplifies stocking problems. Would you like to know more? Write for publication W3681-83

THIS LEAFLET TELLS THE COMPLETE STORY

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Easy installation. Easy contact inspection. Easy-to-operate push-buttons. Modern and pleasing design. Provision for remote control and separate coil supply. Single-phasing protection and ambient temperature compensation give optimum motor protection. Overload heaters supplied in separate packs for ratings up to 5 horse-power.

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AUSTRALIAN MACHINE CUTS TOOL GRINDING TIME

MELBOURNE

A SPECIALLY designed vertical platen grinder has cut tool grinding time by up to 80 per cent at an Australian electrical factory, Telephone & Electrical Industries Pty. Ltd., Meadowbank, New South Wales.

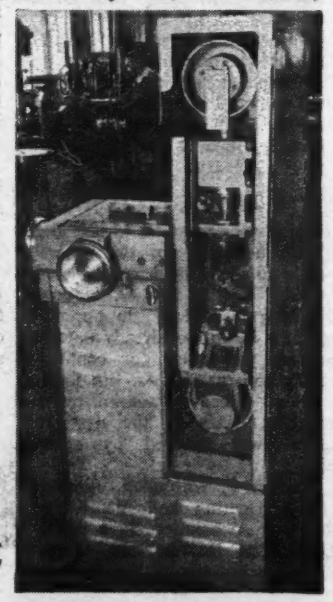
The machine, which is employed on a wide range of fabrication and accessory work, has practically eliminated hand filing in the tool grinding section of the plant.

The platen grinder which was designed and built in about 550 hours by T.E.I. engineers for this particular application, uses a 95 by 5in. abrasive belt.

It is driven by a 1½ h.p. electric motor connected by two belt drive to a main spindle which operates the air-tensioned abrasive belt.

Two-way micro adjustments are provided on the main table but to date they have not been used in actual operation because the work has been sufficiently flexible to allow visual control.

A fake table, set on the T-slotted main table, is fitted with an adjustable protractor for placing and measuring the work.



Pictured right: the new platen-grinder which cuts tool grindery time by 80 per cent.

.....FOREIGN NEWS.....FROM OUR OWN CORRESPONDENTS....

100-KNOT JET BOAT TESTED

NEW YORK

A 100-KNOT hydroplane test boat, the Boeing Company's Aqua-Jet, received its first public demonstration on Lake Washington recently—over two miles.

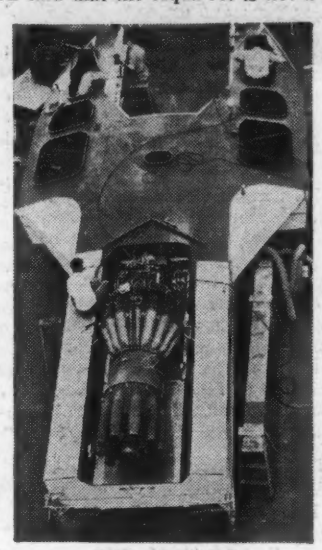
Mr. Lysle Wood, Boeing vice-president and general manager of the company's Aero-Space Division said that the Aqua-Jet is not a speed boat but a research tool.

Boeing have invested more than £8,900 in hull design.

Mr. Wood likened the test boat to a wind tunnel, saying that it will be used for hydrodynamic design studies as a wind tunnel is used for aero-dynamic studies. The tests will include studies of surface and sub-surface designs.

The Boeing, about 38 feet long with a 17-foot beam, is lobster-shaped jet boat with a divided bow, each prow containing a cockpit.

Mounted between the prows is a rig for carrying test models.



THE AQUA-JET
Test boat tested

Single jet

The Aqua-Jet, steered by two cable - controlled steel - forged rudders, one at each aft corner, is powered by a single Allison J33 jet engine mounted on the aft hull.

The boat uses no underwater propeller and at 100 knots, rated at 4,600 pounds thrust, generates about 1,400 horsepower. With a model in the test fixture, speed runs will not exceed 80 knots and will last for about one minute on a measured course.

Each of the two parallel prows of the jet test boat has a cockpit and instrument compartment. The starboard cockpit carries the driver; the port cockpit the test observer.

Steel fuel tanks containing about 300 gallons of 80 octane petrol are externally mounted but faired into the boat's hull in the back of the sponsons.

The Aqua-Jet is the first Boeing hydroplane built since 1919 when the company was briefly in the sports boat business under licence.

N.Z. Islands' power link will be d.c.

AUCKLAND

UNDERWATER cables will be carrying electric power from New Zealand's South Island to the North Island along 25 miles of Cook Strait in 1965.

The laying operation takes place in 1964 and this will be a major engineering feat due to the powerful ocean currents and violent weather experienced in the Strait.

The scheme is also notable because of the decision to transmit the power by direct current. The cable will be designed with a capacity of 600 MW at 500 kW.

There are few large d.c. transmission lines in the world and only in Russia is there one larger than the New Zealand project.

Big furnace for S.A.

THE largest electrically heating bogie hearth furnace installed in South Africa has been completed in the works of Wright, Boag and Head Wrightson at Benoni, Transvaal.

The furnace was manufactured in South Africa by the furnace department of Associated Electrical Industries S.A. (Pty.) Ltd.

AEI also supplied all the electrical equipment, including a high-tension 1,000-kW transformer.

SPECIAL THIS YEAR: LECTURES, FORUMS

U.S. dominate Utrecht 4th instruments fair

IN AN effort to get a strong foothold in the Common Market, 131 U.S. manufacturers have entered the 4th Instrument Fair here which opened yesterday. Total of exhibitors is 697. The U.K. entry is 119.

The Fair covers the complete range of scientific and engineering instruments. More than half the exhibits are of Dutch manufacture, made either to local design or under foreign licence.

Instruments range from surgery to nuclear research, from electronic microscopes with 200,000 times magnification to cold gas machines with temperatures down to −180 degrees C.

A special feature this year is a series of lectures, symposiums, and forums. These cover nuclear reactors, pneumatic control, electrodynamics, testing viscosity, and optical strain measurement with photo-elastic plastic. The Fair closes on October 11.

Spectacular apparatus on view includes microwave measuring instruments, X-ray spectographs, automatic control of titrations instruments which measure and count minute particles, and a new transistorised instrument for measuring radioactive preparations—a striking example of automatisation in the field of irradiation apparatus.

Automatic control

The display of British products includes many kinds of automatic controls, a wide variety of electronic machines, electric valves, radio and television apparatus, aircraft manufacturing and checking instruments, filters, pumps, telephone and telegraph apparatus, optical equipment and nuclear apparatus.

Improved platen material

SYDNEY

AN Australian engineer has invented a new covering for sanding pads and platens which eliminates the problems of excessive drag, high temperature build-up, belt deterioration and premature platen or pad wear.

The engineer, Mr. Garth S. McGill, of Lindfield, Sydney, N.S.W., has patented the material which he calls Slip Cloth.

It is made by a special process which applies a 3/32in. flexible coating of graphite and complex bonding agents to a canvas backing.

The Slip Cloth is claimed to have a very low friction coefficient, reducing platen heat and the load on the drive motor and lengthening the life of sanding belts.

In tests conducted by Australia's largest bumper repair firm (Faith Bumper Service, Gladesville, N.S.W.) the Slip Cloth outlasted imported graphite cloth by more than 30 per cent.

The material becomes harder and more efficient with use. It can be used to cover hand or lever-operated sander pads, wide-belt sander shoes, long pressure pads or bars, platens or shaped fixed-block sanding pads, and is being distributed in standard 4ft. 6in. x 2ft. sheets by Behr-Manning (Aust.) Pty. Ltd.

Anglo-Dutch train sets speed record

THE HAGUE

A 163-TON, four-coach, Dutch electric train seating 281, was put into service on October 1 after establishing a record on its trial ru nof 110 mph. It is a joint product of th eNetherlands Railways and A.E.I. of England.

It is dsigned for fast travel on routes with short distances between stations. From a standing start it reaches its normal maximum speed of 87 miles an hour in 110 seconds, and can be brought to a standstill from that speed in 28 seconds in less than 500 yards.

Its electric traction unit of 1,900 hp is one of the most advanced in the world, and includes what is claimed to be a revolutionary design of motor.

Part of the technique used is unique in present railway service, including automatic take-over between eight traction motors, any six of which can give full power without overheating running all day or even for a week.

The main traction equipment was designed by AEI, and the automatic equipment, probably the most difficult part of the project, also comes from the AEI.

MAGNETIC PLASTIC

A PLASTICS material that has the property of being able to be magnetised locally as well as in its entirety has been developed by Mesa Plastics Co., Los Angeles, California.

The moulded plastic panel in the picture has been written on with an electro-magnet stylus and dusted with iron filings.

Cold-jet engine helicopter

REGULAR flying duties are now being carried out by the FIAT 4700 engine which is used to power the FIAT 7002 helicopter.

The engine consists of a centrifugal gas compressor unit, a mixed-flow annular combustion chamber and an axial flow turbine.

The basic design of the engine was originally drawn up with the object of providing a gas generator for cold jet helicopters, but since then turbojets and turboprops have been developed for fixed wing aircraft.

If you require a top performance, lightweight flexible belt that won't slip, has enormous strength and elasticity with virtually no stretch, then you need a Miraclo nylon-core belt — so write for new 12-page brochure No 405.

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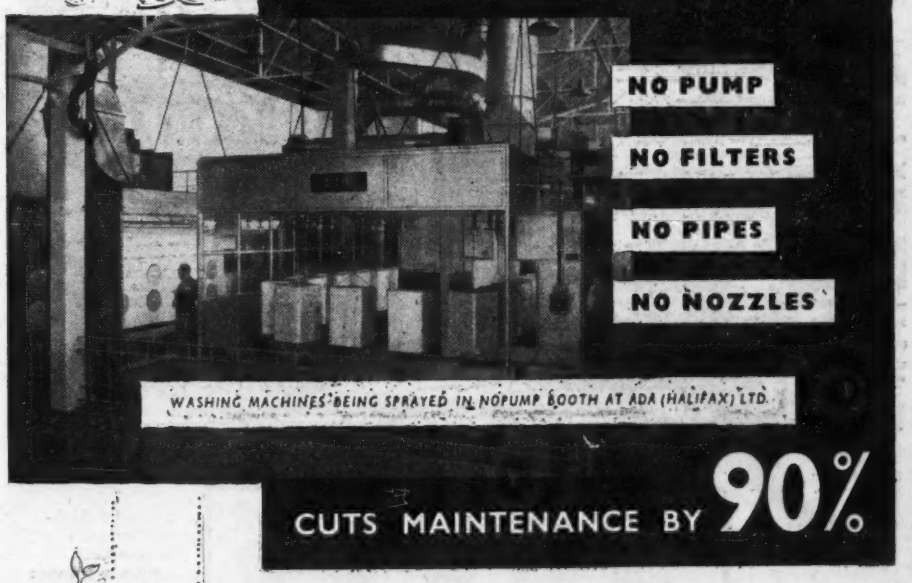
IRA STEPHENS LTD.
ASHTON-UNDER-LYNE

This is nothing to what goes on inside

BULLOWS
NOPUMP SPRAY BOOTH

In this new type of Water-Wash Spray Booth the exhaust air travels at very high velocity over the water surface entraining water. The air/water mixture, moving through controlled changes of direction, provides the scrubbing action.



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NEW Equipment

Gas-flow unit cuts maintenance costs

A SIGNIFICANT saving in maintenance costs is claimed for the A.E.I. Model 202 flow recorder for gases or liquids as, unlike a sealed mercury meter which may require frequent cleaning, it can be left for long periods.

A.E.I./Barton differential pressure units are incorporated, with stainless steel bellows and either forged carbon steel or forged stainless steel housings. Full-line pressure may be imposed across the bellows mechanism indefinitely

The chart mechanism is housed in a weatherproof, die-cast aluminium casing. Precision levelling is not required, and the recorder can be used as a portable test meter. Chart drive can be electrical or spring driven. **Associated Electrical Industries Ltd., Crown House, Aldwych, London, W.C.2.**

Reader service reference No. 1

Gas flow unit.

Non-corrosive still

When fitted with a 3,000 watt element the Manesty stainless steel automatic water still gives an output of 6 to 8 pints an hour.

The distilled water produced is above British Pharmacopoeia requirements. Alternatively, a 1,500 watt element can be fitted to give 3 to 4 pints an hour.

Boiling chamber, lid, inner baffle, condensing tube and nozzle are of stainless steel, the outer baffle is of heat-resistant glass.

The unit weighs 22lb. and is 26in. high. **Manesty Machines Ltd., Evans Road, Speke, Liverpool, 24.**

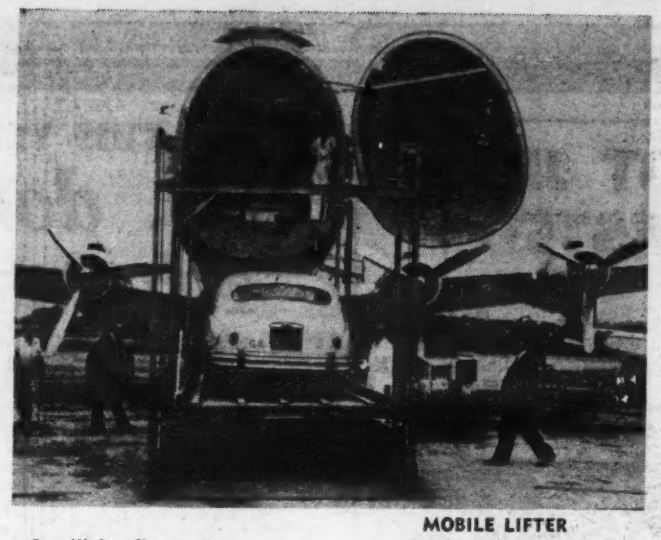
Reader service reference No. 2

Torsion tester

Either manual operation or motor drive can be employed on the Tinius Olsen Lo-Torq torsion testing machine. Hand operation is used when accurate torsional yield strengths and torsion stress-strain curves are required, and the motor, which can be engaged at any angle and gives a rotational speed of 180 deg. a minute, is used for testing to destruction or for production testing.

Alternatively, an electronically controlled variable speed motor giving a range of from 5 to 180 deg. a minute can be supplied.

Loading is measured with torque bars and is mechanically indicated on a 10in. diameter dial. The machine is normally built with a maximum capacity of 10,000, 5,000 or 2,000in.-lb.



MOBILE LIFTER
Single lever control

It will handle specimens up to 1in. diameter and 18in. long. **Edward G. Herbert Ltd., Atlas Works, Levenshulme, Manchester, 19.**

Reader service reference No. 3

Mobile lifter

The Car-go, a battery operated hydraulic lifting platform with a load area 18ft. by 7ft., and a maximum lift of 11ft. 6in., was designed to load cars on to cross-Channel ferry aircraft but it may well prove of value for other industrial applications.

A 9 h.p. electric motor drives a hydraulic pump working at a pressure of 1,000lb./sq. in. to operate a single horizontally mounted hydraulic cylinder, the ram of which is connected by steel cables to masts at each corner of the lifting platform.

Control of the lifting operation is by a single lever and a safety valve protects the mechanism from excess loading. **The Little Green Engineering Co. Ltd., Collyhurst Road, Manchester, 9.**

Reader service reference No. 4

Drill grinder

By using a chuck with Stellite inserts in place of a large number of bushes, and by keeping the number of controls and adjustments to a minimum, the price of the ZB drill point grinder has been held down to £158.

The machine will grind drills of from 0.040in. to 9/16in. diameter, left-hand or right-hand, straight or taper shank, with a point angle adjustment of from 60 deg. to 180 deg. (flat bottom).

A self-centring chuck grips the flutes of the drill and also holds a standard diamond tool for dressing the wheel. **Z. Brierley Ltd., Queen's Road Works, Llandudno, N. Wales.**

Reader service reference No. 5

250 ton press

A large bed area in proportion to the press tonnage, a positive automatic ram return, and automatic ejector are features of the latest Sack & Kiesselbach 250-ton press for coining, deep drawing, and extruding of large, light components.

Bed area is 29in. by 29in. and power of ram return and ejector is approximately 6 per cent of the working pressure.

Working speed of the ram is 0.4in./sec. for pressures up to 50 tons and 0.1in./sec. for pressures above this. Rapid approach speed is 3in./sec. and return speed 4in./sec. Maximum daylight is 23in. and maximum stroke 15in.

Ram return, ejection and ejector return are automatically controlled and two switches must be operated simultaneously to close the press.

Approximate weight of the press complete with pump and control units is 10 tons. No special base is required. **The Rockwell Machine Tool Co. Ltd., Welsh Harp, Edgware Road, London, N.W.2.**

Reader service reference No. 6

Air-operated clamp

Latest version of the Hydraclamp, the Senior, uses an air-hydraulic intensifier for clamping. It will support a 100 lb. load at 12-in. centres at an angle of 45 deg. and gives a higher operating speed.

Hydraclamps consist of a ball-joint in a substantial cast iron housing allowing movement in three planes. The ball joint can be locked hydraulically by operating a toggle or turning a wheel. **Spencer, Franklin Ltd., 11 London Bridge Street, London, S.E.1.**

Reader service reference No. 7

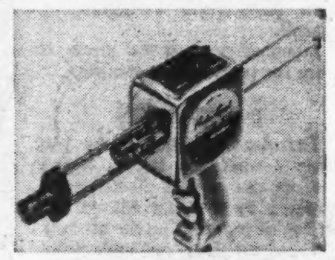
Lightweight welder

Although the Bren Weld 90 is essentially a spot welder it works on the arc weld principle, using coated electrode which cuts a hole through the material to be welded and immediately fills it. The finished weld resembles a rivet.

The gun is used from one side of the work only and is said to produce sound welds between sheets of up to 12 S.W.G. and to weld a sheet of 12 S.W.G. or less to a section of any thickness.

Total weight of gun and transformer is 43½lb. and the gun itself weighs only 2½lb. Feed rate, time control and resetting are fully automatic. The time control dial is located on the gun itself.

The transformer has five tappings and measures 12½in. by 12in. by 18½in.; it can also be used for standard arc welding on a 20 per cent duty cycle, a thermal overload trip is incorporated.



LIGHTWEIGHT WELDER
Spot-welding by arc

Price of the equipment is £108 10s. complete with transformer, cables and welding gun. **E. P. Barrus (Concessionaires) Ltd., 12 Brunel Road, London, W.3.**

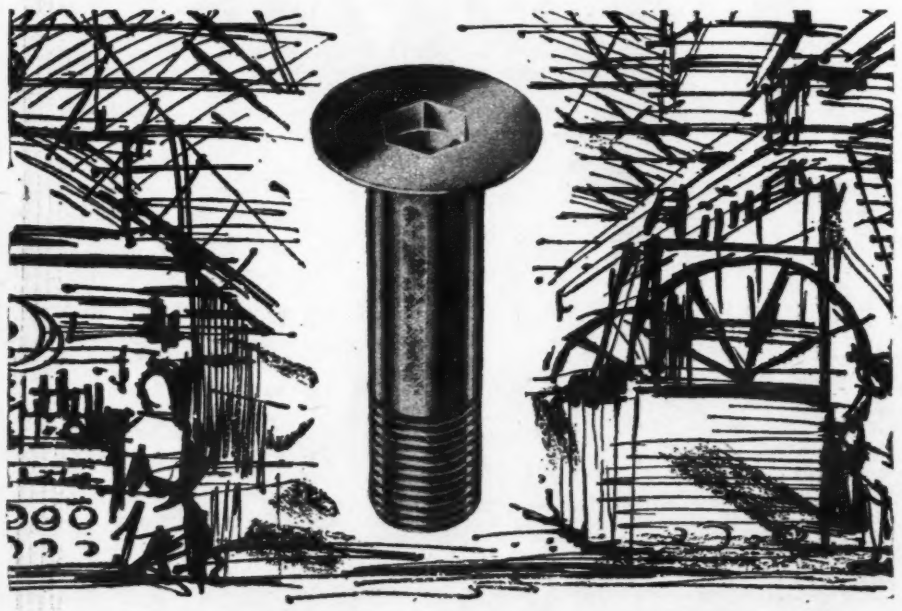
Reader service reference No. 8

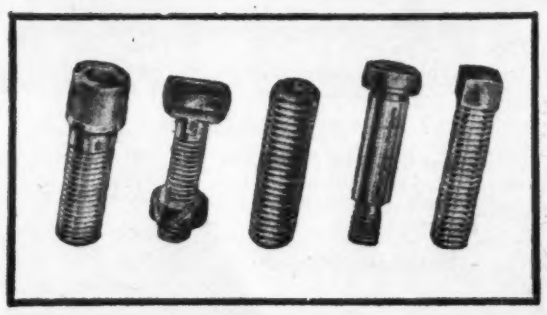
The screws with the fourth dimension

Any screw can present a faultless appearance. It can be measured optically, microscopically, scientifically, yet the vital dimension escapes physical detection.

That dimension is in-built performance. A basic characteristic of Unbrako screws which is proved by a negative. The fact that Unbrako screws do NOT fail industry even when subjected to the most prolonged of gruelling conditions.

Reliability stems from research. No screw in the whole wide world is backed by more research than Unbrako.





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READER GUIDE

ON this page we publish the latest information on new equipment of interest to engineers.

Included: Inspection and test equipment, hand tools, machine tools, production machinery, and measuring and control equipment. Fill in the Reader Service Card on page 20 for further details of any items on pages 18 and 19.

stainless steel tubing

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NEW Components

Counter unit uses transducer system

WITH a maximum counting rate of more than 20 a second, this unit can be used to count shaft revolutions, reciprocating motions, and other machine operations. Where linear motion can be translated into rotary motion the unit can also be employed for length measurement.

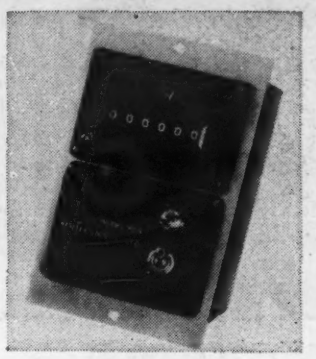
A magnetic transducer has been developed for use with the counter and is available in four different mounting versions.

If mounting space is limited standard small transducers can be used, in which case the necessary pulse-shaping circuits are built into the counter.

Both versions are fitted with mains switches and neon warning lights and no warming-up period is required.

Power consumption is only a few milliwatts. **Pentechnique Ltd., Imperial Lane, Cheltenham, Glos.**

Reader service reference No. 9



COUNTER UNIT
Mains operated

Weld indicator

WELD INDICATOR
Shows pressure

Pressure between electrodes on resistance welding machines is recorded by the Presstotest indicator.

The unit is allowed to rest on the bottom electrode. The electrodes are then brought together and the pressure in pounds is indicated on the dial.

Two ranges are available: 0-600 lb and 0-2,000 lb. **A. S. Young & Co. Ltd., Woodside Lane, London, N.12.**

Reader service reference No. 10

Electric motors

Four main types are available in the Crompton Parkinson T.30 range of FHP motors designed for office machinery, computers, heaters and coolers, small workshop appliances and laboratory equipment.

They are: shaded pole, designed for low noise levels; capacitor start, induction run; capacitor start, capacitor run; and split-phase start.

Power ratings vary from 1/40 h.p. at 1,350 r.p.m. to ⅛ h.p. at 1,425 r.p.m.

There are four possible methods of mounting (at any angle): resilient base; resilient rings without base; endshield pad with tapped holes or endshield pad with studs.

Shaft extensions of ¼-in. diameter are used, although the bearings allow ½-in. diameter shafts to be provided at little extra cost. The oil wells contain sufficient oil for two years' running at normal temperatures. **Crompton Parkinson Ltd., Aldwych, London, W.C.2.**

Reader service reference No. 11

Heater element

Ceramic formers, which can often be a source of trouble in immersion heaters, are replaced by magnesium oxide sheathed elements in a withdrawable type immersion heater announced recently.

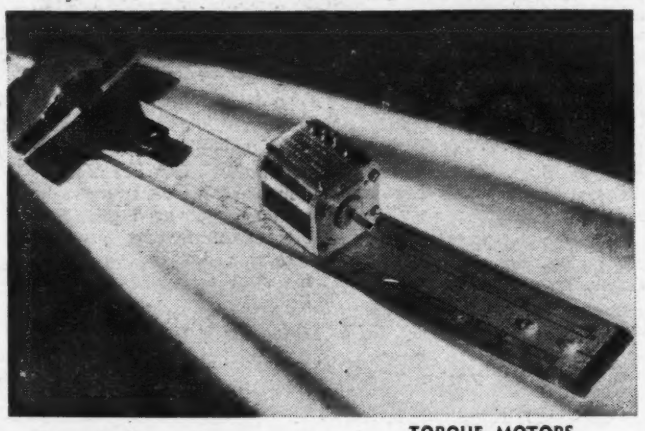
A high loading for a given length is permissible with Eltrolin elements and the element can be withdrawn form the pocket without draining the tank. **Eltron (London) Ltd., Accrington Works, Strathmore Road, Croydon, Surrey.**

Reader service reference No. 12

Quick-action relay

Relays are often required for fault alarm circuits where a fleeting contact has to cause an alarm to sound until manually cancelled; there are also many applications in automatic control circuits, e.g. for bringing up and releasing contractors or for starting timers.

The desired effect has normally been achieved with relays fitted with mercury switches, but there is now a unit available consisting of a small subsidiary relay mounted inside a standard plug-in relay.

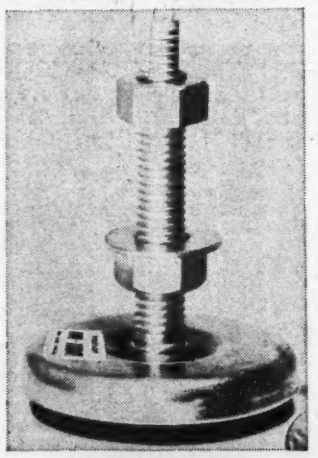


TORQUE MOTORS
Comprehensive range

The subsidiary relay is connected so that it operates for approximately a tenth of a second when the main relay is energised or released. **Robinson & Co., Ltd., 5 Church Road, Richmond, Surrey.**

Reader service reference No. 13

Machine mounts



MACHINE MOUNTS
Miniature type

A small version of the Vulcascot anti-vibration Level-Mount has been developed for office machinery, small workshop machines and electronic equipment.

The Mini-Mount, as it is known, can be adapted for different applications by using screws of larger diameter or brackets which can be screwed to the sides of wooden bench-legs.

Neoprene is employed for the shock-absorbing pads and the metal parts are of cadmium-plated steel. **Vulcascot (Great Britain) Ltd., 87 Abbey Road, London, N.W.8.**

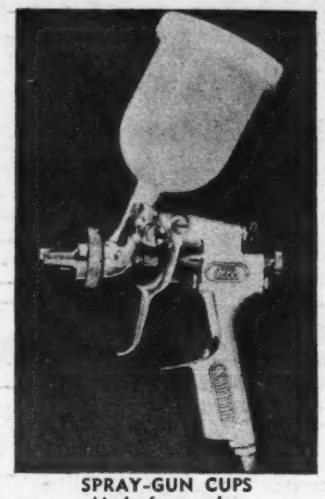
Reader service reference No. 14

Spray-gun cups

A 2/3-pint nylon cup for the Bullows L600 spray gun weighing only 2¼ oz. compared with 8½ oz. for the equivalent metal cup is now available. It is also impervious to most known solvents and cannot be dented.

A screw-on nylon lid with a sealing device which obviates the need for a lid gasket is provided with the cup. A 1¼-pint version is also available. **Alfred Bullows & Sons Ltd., Long Street, Walsall.**

Reader service reference No. 15



SPRAY-GUN CUPS
Made from nylon

Torque motors

Electro - mechanical torque motors have been manufactured by de Havilland's for military applications for a number of years, but a wide range of these units are now available for use in other fields.

The model illustrated can be supplied in various forms, maximum torque being 1,500 gm. cm. It weighs approximately 4½ oz. and measures 1.9 in. by 4 in.

The standard version uses Alco magnetic materials but there is also a low hysteresis type employing Radio Metal materials. Larger models are available with torques up to 2,500 gm. **The De Havilland Aircraft Co. Ltd., Manor Road, Hatfield, Herts.**

Reader service reference No. 16

Tank-mounted pumps

By saving installation space and dispensing with suction piping entirely, the K.E.B. range of pumps for forced lubrication duties on large turbines and diesel engines can save significantly.

The pump itself is installed within the tank with the drive motor and by-pass valve above the cover plate.

Outputs: 74 to 1,320 gal./hr. **Mirlees (Engineers) Ltd., Earl Haig Road, Hillington, Glasgow.**

Reader service reference No. 17

R&D

A new monthly technical magazine for the 103,000 scientific workers engaged in research and development.

Although there may be little common ground between the products of one industry and another the techniques of research and development are universal. It is the purpose of R&D not to report the results of research programmes but to pass on useful information about the means by which results were obtained—in short, to assist the cross-fertilisation of scientific ideas in the field of research and development.

In addition to information about new methods and new techniques R&D will provide details of new equipment and apparatus as it comes on the market and which forms no small part of the £655 million which it is estimated will be spent on research and development this year. R&D has already had the co-operation of many of the research associations, of independent sponsored research organisations and of the research and development departments of many great companies.

R&D is available to bona fide scientists, engineers and technicians engaged in research and development on payment of an annual registration fee of 10/- (12 issues post free). Applications for registration together with the remittance for 10/- should be sent to the Circulation Manager, R&D, Tower House, Southampton Street, London, W.C.2.

NEW Materials

ELECTRO-FORMED METALLIC MESH

HOLE sizes from 0,027in. down to 0.001in. can be specified for Perflec electro-formed mesh.

The material consists of a pure copper core clad with nickel and normal thicknesses are from 0.010 in. to 0.003 in. It can frequently be used without support and can be soft soldered, spot or seam welded.

Edge binding is not usually necessary and fraying does not occur. Perflec is produced in rolls 3ft. wide and up to 100ft. long, and is available in fifteen different aperture sizes and thicknesses. **N. Greening & Sons Ltd., Britannia Works, P.O. Box 22, Warrington, Lancs.**

Reader service reference No. 18

STIFFER FOIL
Aluminium alloy

Stiffer foil

Production of a hard aluminium foil—N.S.4—from an alloy containing 1.8 per cent magnesium and up to 0.5 per cent each of manganese and chromium has just begun in this country.

This alloy gives greater stiffness and strength than can be obtained from commercially pure aluminium or from the 1.25 per cent manganese alloy N.S.3. Thicknesses down to 0.025 mm. will be available.

The greater stiffness of the foil is graphically illustrated in the photograph, which shows a sample of N.S.4 alongside a strip of normal aluminium foil.

Tensile strength for 0.06 mm. thick strip is 16-18 ton/sq.in. **Venesta Foils Ltd., Thorn House, Upper St. Martin's Lane, London, W.C.2.**

Reader service reference No. 19

Flexible conduit

One of the latest applications for P.T.F.E. is the production of a range of flexible conduits or harnesses available in 6ft. lengths (or multiples of 6ft.) in a range of bore sizes: ¼in., 5/16in., ⅜in., 7/16in., ½in., and 9/16in.

Penflex conduits can be supplied with or without stainless steel braiding and they have a number of advantages over conventional low-tension electrical harnesses, including indefinite life, low weight (1in. bore conduit weighs less than ½ lb. a foot), permanent flexibility, ability to be collapsed 20 per cent axially and to resist kinking. **Palmer Aero Products Ltd., Penfold Street, Edgware Road, London, N.W.8.**

Reader service reference No. 20

Crepe masking tape

Rolls, 60yds. long, of Tesakrepp, a crepe texture masking tape with pressure-sensitive adhesive backing, can be pulled out during application to a length of 80yds. This degree of stretch allows the tape to be applied to difficult contours and curves with ease.

Type 322 will withstand temperatures of up to 175 degrees F and moisture-proof grades, and tapes to resist higher temperatures can be supplied. Widths from ½in., to 4ins. are available. **Metamicals (Cannon) Ltd., 60 Cheapside, London, E.C.2.**

Reader service reference No. 21

Be-Cu strip

All Mallory 73 beryllium copper strip will in future be supplied with beryllia-free surfaces.

Beryllia is a hard abrasive oxide of beryllium which is not removed by normal cleaning methods, and the new material is said to give improved tool life with no reduction in the mechanical properties of the finished product. There is to be no increase in price. **Johnson, Matthey & Co. Ltd., 73 Hatton Garden, London, E.C.1**

Reader service reference No. 22

Tank lining

Tank lining material of hard-rubber known as Duraline is said to have greater impact resistance and flexibility than any other true ebonite.

It is particularly suitable for the lining of vessels for the transportation of liquids, or vessels subject to vibration and shock. It has been used in temperatures of up to 105°C for long periods without deterioration.

Unlike standard ebonites, Duraline does not harden in use but softens slightly. **The Dunlop Rubber Co. Ltd., Cambridge Street, Manchester.**

Reader service reference No. 23

Phosphating process

Among the advantages offered by a non-aqueous phosphating process developed by the Paints Division of I.C.I. is the fact that no rinsing or tank heating are required and no sludge is formed in the processing tank.

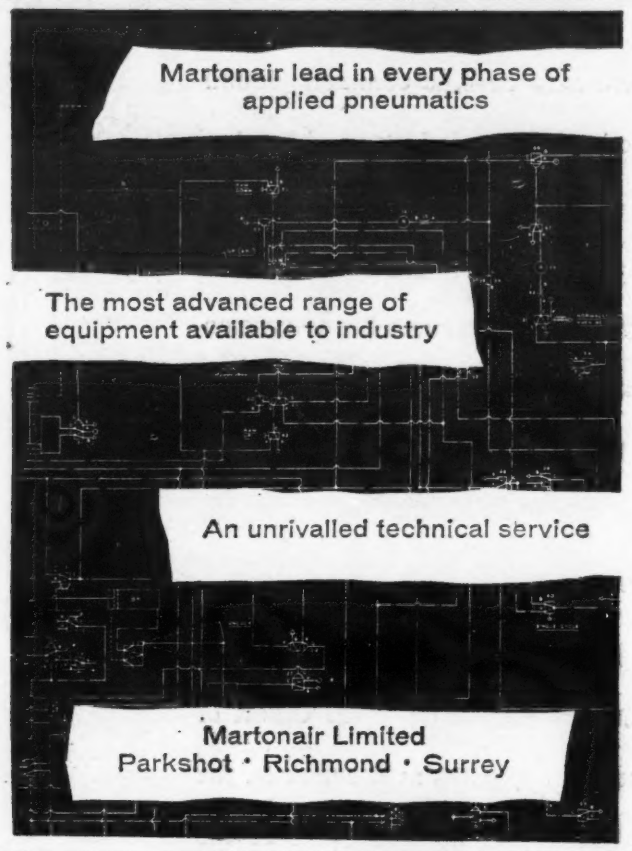
The Kephos system is said to give exceptional corrosion resistance and the possibility of work becoming contaminated by water-borne impurities is eliminated.

Treated components can be stored outside for up to a week, or indoors for up to six months.

The treatment may be applied by dipping, brush, roller, spray or flow coating. Chemical costs are high but against this can be set the saving in heating and plant maintenance costs. **Imperial Chemical Industries Ltd., Millbank, London, S.W.1.**

Reader service reference No. 24

PHOSPHATING PROCESS
Non-aqueous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NEW Publications

FOR those who were unable to visit the Sheffield station of the British Iron & Steel Research Association during the open days in June, a set of notes titled **Summary of Displays and List of Associated Literature** has been compiled by BISRA's Development and Information Services.

The notes consist of slightly condensed versions of the information that appeared on the display boards relating to each exhibit, and a list of other literature available.

Reader service reference No. 25

Centrifugal air impellers form an important part of the production of Batwin Electric Motors Ltd. and any diameter from 5in. to 12in. in seventeen different blade widths can be supplied.

Reader service reference No. 26

Industrial ovens for stoving, drying, and low temperature heat treatment, and a range of dust collectors, filters and spray booths are described in **Industrial Ovens and Filtration Equipment,** a new bulletin published by Controlled Heat & Air Ltd.

Reader service reference No. 27

An eight-page illustrated brochure containing full details of lighting, operating, and temperature settings for the range of gas-fired radiant heat panel ovens produced by Parkinson Cowan Industrial Products, is available from the firm.

Reader service reference No. 28

Modern Foundry Practice, a recent publication from The Gas Council, draws attention to the advantages of town gas for a number of foundry processes such as sand drying, mould drying, shell moulding, and cupola lighting.

Reader service reference No. 29

Properties, characteristics, and applications of Deckor P.V.C. pastes are covered in a series of technical leaflets available in book form from Scott, Bader & Co. Ltd.

The pastes can be spread, cast, sprayed, moulded or dipped, and are cured at a temperature of 170 deg. C. to give flexible protective, or decorative coatings.

Reader service reference No. 30

A leaflet **Ty-Rock Full Floating Screens,** produced by International Combustion Products Ltd., describes two large rock screening units for big scale production plants.

The screens, up to 16ft. wide and 16ft. long, are actuated by a double eccentric shaft floating on shear type rubber mountings.

The shaft is supported on the stationary base by side arm assemblies also floating on rubber.

Reader service reference No. 31

A pocket-size folder produced by Rockweld Ltd.—**What We Sell**—contains brief information on arc-welding electrodes, welding plant and accessories manufactured by this firm.

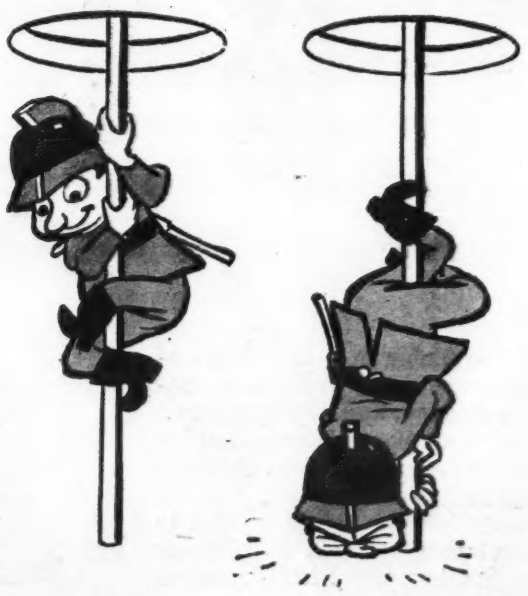
Reader service reference No. 32

Specifications of a new leak-proof ball valve are given in **Catalogue Section A3** from Joshua Hindle and Sons Ltd.

The valves, with Fluon sealing rings seated on the balls, giving exceptional ease of operation, are available with bodies of cast iron or stainless steel, and in sizes from 2ins. to 16ins.

Reader service reference No. 33

Conventional...or unconventional



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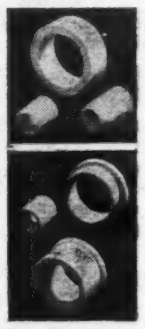

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FINANCE AND COMMERCE

Trade agreements

GKN TO MAKE YUBA PRODUCT

BIRWELCO LIMITED, a subsidiary of the Guest Keen Nettlefold group, have signed an exclusive agreement with Yuba Consolidated Industries Inc., of Tulsa, Oklahoma, USA, for the production and marketing of Aimco Transaire air-cooled heat exchangers in Europe and the Commonwealth.

Substantial orders for this kind of equipment have been received by **Birwelco** from the oil and chemicals industries.

Finned tubes and electrically driven fans are employed in the air-cooled heat exchangers, designed for the oil refining, petrochemical, and chemical process industries.

Plessey have granted an exclusive licence to the **Centralab Division of Globe Union Inc.**, U.S.A., to produce, sell, and use in the U.S., moulded track potentiometers of Plessey design.

Centralab have also been allowed a non-exclusive licence to make, use, and sell these potentiometers in Canada and Central and South America. The agreement covers an initial period of ten years.

The track in this product is a phenolic moulding loaded with controlled portions of connecting carbon filler. It has a low electrical noise factor.

Kloeckner-Humbolt-Deutz AG, of Cologne, West Germany, and French engineers **Fives-Lille-Cail** have concluded an agreement to co-operate in the manufacture of cement plants.

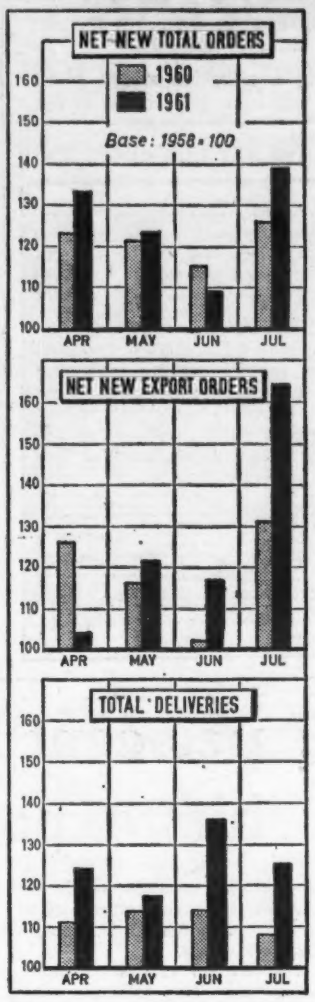
ARE TRADE MISSIONS ANY USE?

INQUIRIES made by a staff member of the Stanford Research Institute, U.S.A., into 365 investment moves by 205 companies in the U.S., Europe and Japan show that only in two cases was interest stimulated by special trade missions to the investor's country.

Five main government policies were found to be "conducive to investment".

They were the establishment of, or adherence to, a national development programme, favourable terms for transfer of profits and repatriation of capital, no discrimination against foreign ownership or control, equality of treatment with domestic enterprises and freedom from strict regulations on ownership and management.

EXPORT ORDERS UP



Production keeps pace with rising demand

VIGOROUSLY rising production in the engineering and electrical goods industries is keeping up with sharply rising export orders and avoiding a general lengthening of delivery dates.

New orders, production and deliveries all increased during July, leaving orders on hand less than two per cent up on the June level.

Acceleration in the output of the engineering industries is continuing. The Board of Trade's index figure for deliveries in July reached 125, against 108 twelve months earlier.

Provisional estimates give an increase of 16 per cent in the production of the engineering and electrical goods industries in July over the same month in 1960.

The net new orders for the group of industries which covers engineering and electrical goods, locomotives and track equipment, railway carriages and wagons, heavy commercial vehicles and wheeled tractors were 11 per cent better than a year ago.

Best for two years

Export orders on hand have risen from 99 in July, 1960 (January, 1958—100) to 111 this July. Provisional figures for net new export orders show the largest increase in one month for at least two years.

From 117 this June the new export order index for July has shot up to 164, 25 per cent above the 1960, July, level of 131.

When the August figures are available from the Board of Trade it will be seen to what extent this year's later summer holidays may have helped towards the 16 per cent jump in production.

Over the first four months of 1961 the rate of increase compared with the year before was three per cent. In May and June production in the engineering industries had risen to nine per cent above the same months of 1960.

BRITISH EQUIPMENT FOR POLAND

THIRTEEN stern trawlers to be built in Poland will have electrical equipment made by Laurence, Scott & Electromotors, Norwich and Manchester.

Main engines, will be made by Mirlees, Bickerton and Day, of Stockport.

Aircraft sales improve

EXPORTS from the British aviation industry in the first eight months of 1961 were worth £109 million, an improvement of £10.5 million over the same period of last year.

Overseas earnings by the industry are now running at an annual rate of £163.5 million.

Aero-engine sales achieved the largest rise, reaching £57.7 million, 12 per cent better than last year. Sales overseas of complete aircraft and parts were £46.3 million—a £3 million improvement.

More than a third (£413 million) of the post-war total of aircraft industry exports—£1,193 million—are accounted for by aero-engines.

The upward trend continued in August, the last month for which figures are available, and Canada was the best customer, both for aircraft, parts and engines.

ENGINEERING CONTRACTS

£6m power plant for Egypt

CAIRO Electricity and Gas Administration have placed a £6 million comprehensive contract with English Electric for a 120,000 kW extension to a continental-built power station.

The order is one of the largest from the Middle East for a British firm for some years.

Two 60,000 kW steam turbines will be made at Rugby, the alternators, transformers and 63,000 volt switchgear at Stafford and the low voltage switchgear and fusegear at Liverpool.

Simon-Carves Ltd., of Stockport, will make the four boilers.

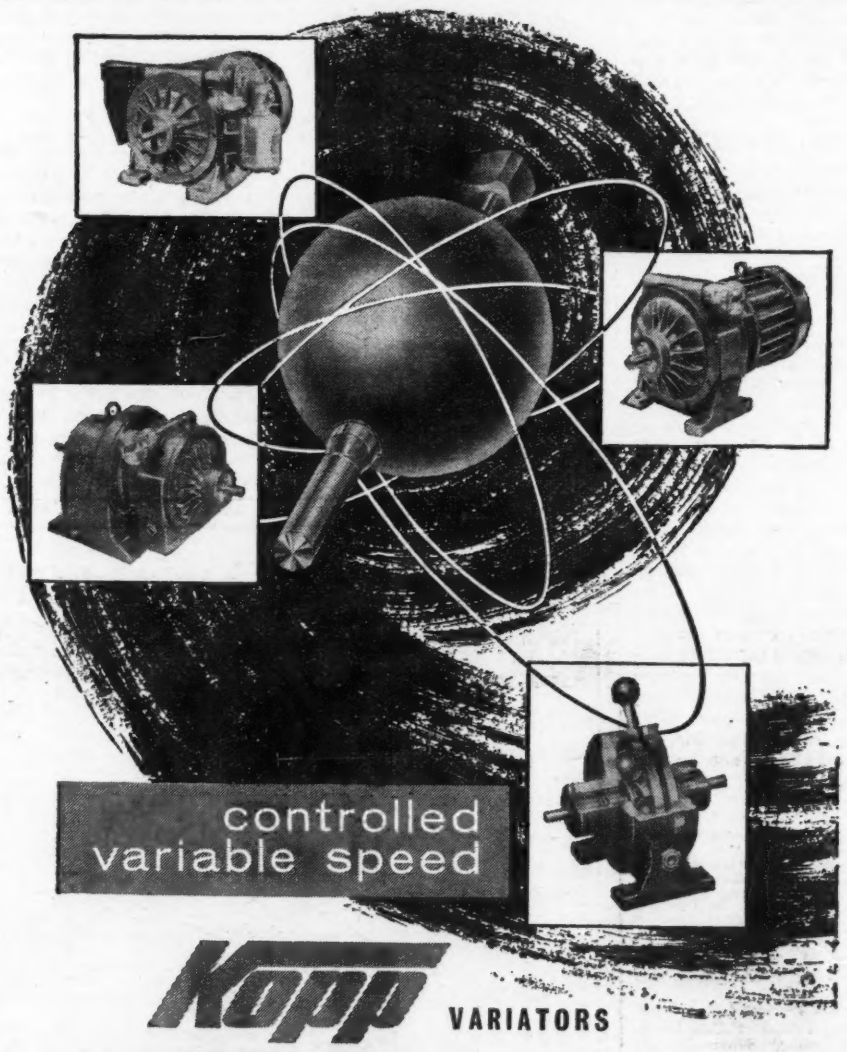
* * *

GWYNNES PUMPS, the Hammersmith and Lincoln associate of W. H. Allen, of Bedford, are to supply irrigation pumping machinery for British Guiana.

Two 42in. vertical spindle, axial-flow pumps with syphon discharges will be manufactured, delivered to site, and erected. Consulting Engineers: Sir William Halcrow & Partners.

* * *

MECHANICAL handling engineers Sovex Ltd., of Erith, Kent, are to produce a conveyor system for letters at the new London western district office of the Post Office.



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FINANCE AND COMMERCE

BTC places diesel orders worth £2.5 million

MAIN line diesel-electric locomotives and equipment for other multiple-unit trains, worth a total of £2.5 million have been ordered by the British Transport Commission.

English Electric are to build seventeen 1,750 h.p. locomotives, worth £1 million, at Preston and Newton-le-Willows. Delivery of these locomotives for use by the North Eastern Region in the Hull area begins next October.

For the Eastern Region, in the Sheffield area, Brush Electrical Engineering are to manufacture ten 1,365 h.p. locomotives.

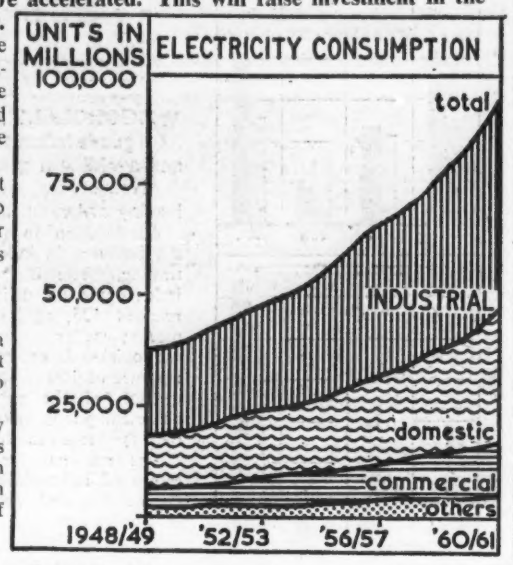
A third order, for 20 sets of equipment, including diesel engines and transmissions, and for 20 sets of equipment for trailer cars, has been placed with British United Traction.

MORE PLANT WOULD END CEGB LOSSES

SWIFTLY rising national consumption of electricity is creating a situation where plant construction programmes will have to be accelerated. This will raise investment in the power industry to more than £400 million a year.

Demand for power has now outstripped the 1958 estimates, with industrial consumption leading the advance, and it is expected that by the winter of 1964/65 there will be a maximum demand of 33,000 MW, more than an eighth above the forecasts of three years ago.

By the end of 1964/5 capital investment estimates need to be raised by £200 million to provide the conventional and nuclear power stations, transmission lines, and distribution systems needed to meet the growing consumption.



Bigger and bigger demand

In 1965/67 demand is expected to increase by a further 5,000 MW and it is to provide for this that outlay on fixed assets during that time is expected to reach £400 million a year.

Sir Robertson King, chairman of the Electricity Council, says the capacity of the supply industry is more fully utilised than most capital assets in British industry. Power station plant installed in the past ten years has been working on the year-round average of 100 hours a week.

The Central Electricity Generating Board, also making its annual report, has shown how hard work with out-of-date equipment can turn a profit into a loss.

From surpluses of £10.8 million in 1958/9 and £5.4 million in 1959/6 the CEGB fell to a deficit of £1.9 million in 1960/61, the third year of its existence.

Demand in August, September and October of 1960 shot up to 17.4 per cent above those of the same months in the year before, causing the CEGB to operate older stations, of lower efficiency, for longer than had been planned. Many of them are in positions where the cost of coal is high.

CEGB figures show that trading income for the year was £425.5 million, 11.4 per cent above the previous year; expenditure was £426.7 million, 13.4 per cent higher.

Investors wait for economic revival

WEEK IN THE CITY

BY OUR CITY EDITOR

DISCOURAGING company results and continuing evidence of the pressure on profit margins have made for subdued conditions in stock markets, and prices in many sections have tended to drift lower through lack of support.

News of a sharp rise in the index for engineering orders, from 109 in June to 139 in July, had little effect on engineering share movements.

With many leading companies reporting either a reduction in profits or a failure to expand in line with turnover, a good deal of the glamour has gone out of the ordinary shares.

Although selling has not been heavy, many investors are reluctant to re-enter the market until the economic outlook is clearer.

Among the factors which have helped to dampen sentiment has been the half-yearly report of Associated Electrical Industries. This showed that although gross profits have improved, compared with the first half of 1960, and the interim dividend is being maintain, margins are still unsatisfactory and there has been a slight falling off of new orders.

The real sting in the AEI announcement was the board's warning that the total dividend for 1960 (15 per cent) would not necessarily be kept up for 1961.

This reminder that dividends, even from the largest companies, sometimes have to be reduced had fairly wide repercussions in market activity.

Sombre Warning

An even more sombre warning has been given by Cammell Laird, the Birkenhead shipbuilding and engineering group, which has announced that profits are expected to be "appreciably lower" than last year. Although the interim dividend is being maintained at 3 per cent, the directors say it is unlikely that last year's 12 per cent total will be repeated.

The setback is attributed to falling demand for steel plates and railway rolling stock, coupled with difficulties in the shipyard.

Doxford & Sunderland Shipbuilding & Engineering has also reported lower profits, and Daniel Adamson, engineers and boiler makers, expects an overall loss in 1961, though output has risen and the general position is improving.

Increased Profits

Not all the engineering company news has been bad. Qualcast has increased its trading profits by nearly 10 per cent, to a new peak of £1.8 million, while Hunt & Moscrop (Middleton), which manufactures textile and paper-making machinery, has announced a sharp rise in profits, and is raising its dividend from 12½ per cent to 15 per cent.

Following approval at its annual meeting, Davy-Ashmore shares are now being traded in their new 5s. form, instead of the former nominal value of £1 each.

7 per cent Bank Rate hits export credit

A SHARP reminder of the serious effect of the high Bank Rate on the export efforts of the capital equipment industry has been made by Mr. D. F. Campbell, retiring chairman of the Davy-Ashmore group.

A seven per cent Bank Rate means that Davy-Ashmore customers must pay eight per cent interest on outstanding credit.

Since they can get credit around the world for six per cent, says Mr. Campbell, this situation is a handicap to export efforts.

AVOID EFFECTS

If Bank Rate is to continue to be used as an economic regulator then it is, in the view of the Davy-Ashmore chairman, essential to find some way of insulating British export trade from its effects.

With £29 million worth of work in progress, Davy-Ashmore is producing capital goods for the iron and steel industries, for the oil, gas, chemicals, petrochemicals, non-ferrous metals and other industries.

Entry by Britain into the Common Market is expected at Davy-Ashmore to benefit the company. The belief is that despite some disadvantages such a step should help to generate increased demand in Europe for the products of the equipment made by the group, and therefore increased demand for the equipment itself.

The company currently has good order books. Mr. Campbell's prediction is that if their plans materialise the results for the current year should not be disappointing.

Opperman's: £450,000 bid

A CASH offer worth more than £450,000 for the gear cutting, engineering and light car firm S. E. Opperman has been made by the Expert Tool Group.

Sir Donald Banks, chairman of E.V. Industrials, who control Opperman, said at the annual meeting of the parent company in June that before the company could make its contribution to the group there was much work to be done.

The directors of E.V. Industrials were then considering the sale of one or more subsidiaries.

Expert Tool are a holding company controlled by the Northern Mercantile and Investment Corporation.

Cars set-back hits Triplex profits

FALLING output from the car industry has cut the profits of Triplex Holdings Limited from £1,750,000 in 1959/60 to a little over £1,000,000 in 1960/61.

The company's estimate for the current year is that the sale of safety glass to the car makers will be almost exactly the same number of square feet as last year.

This is not neccessarily a good guide to the turnover and profits for the year as demand for different forms and types of glass vary. At the moment the expectation is of rather better results.

Profits from the Triplex engineering group improved during the year.

NEW Companies

These particulars are selected from the daily Jordan's Register, published by Jordan & Sons Ltd., 116 Chancery Lane, London, W.C.2.

Richard Dunston Industries Ltd. To effect a merger between **Richard Dunston Ltd.**, and **Henry Scarr Ltd.**, and to co-ordinate the administration of those companies and to carry on the business of shipbuilding in all its branches, etc. Nominal capital, £300,000 in £1 shares (250,000 cum preference).

A. J. Engineering Co., Ltd., 19 Victoria Buildings, Queen Victoria Road, Coventry. Nominal capital, £10,000.

Carlex (Engineers) Ltd., Nominal capital £100. Subs: Corothy M. Graeme and Paul G. Graeme, 61 Fairview Avenue, Gillingham, Kent.

Ferro-Mag. (Electrical) Ltd., 177 Regent Street, W.1. To carry on the business of electrical and electronic engineers, etc. Nominal capital £500.

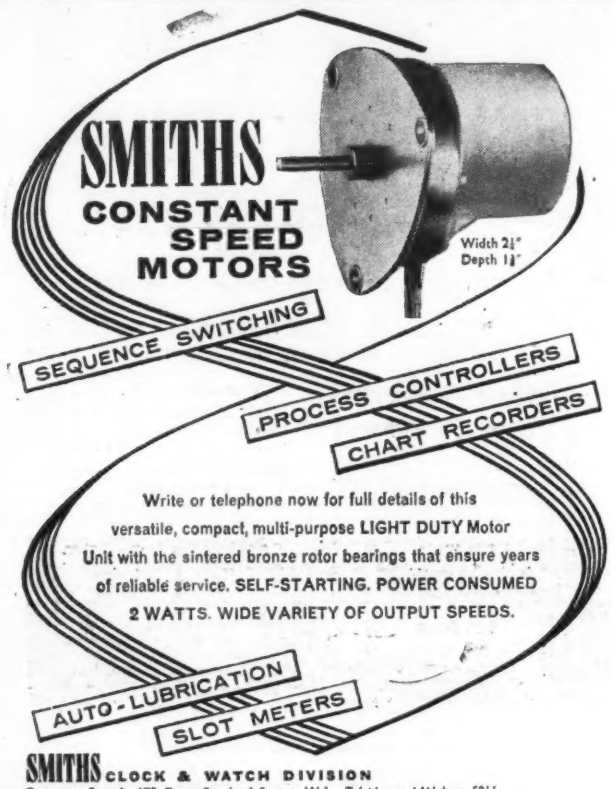
Hynes Whelon Ltd., 44 South Street, Reading, Berks. To carry on the business of manufacturers and dealers in wire, mesh, gauze, etc. Nominal capital £200.

Knowles Electronics Ltd., Moor House, London Wall, E.C.2. Directors to be appointed. Subs: Knowles Electronics Inc. Franklin Park, Illinois, USA. Registered by solicitors, Frere Cholmeley & Nicholsons, W.C.2.

Francis L. Flinn Ltd., 35 Bishop Street, Coventry. To carry on the business of electrical engineers. Nominal capital £1,000.

Norris Tools Ltd., Adswood Lane West, Stockport, Cheshire. To carry on the business of ironmasters, etc. Nominal capital £2,000.

Simon-Carves (Export) Ltd., Bird Hall Lane, Cheadle Heath, Stockport, Cheshire. To carry on the business of mechanical, chemical and nuclear engineers, etc. Nominal capital £100.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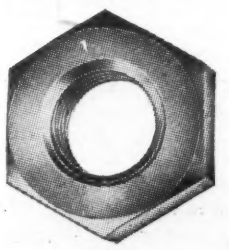

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PRODUCTS SWITCH BEATS IMPACT OF STATE CUTS

INTENSIVE efforts are being made by the Powell Duffryn group to overcome the effect of a cut-back in railway wagon orders by British Railways, and a check in the nuclear energy programme.

Group subsidiaries affected were Powell Duffryn Engineering Ltd., 50 per cent of whose turnover had in the past been derived from railway wagon building, and Powell Duffryn Carbon Products Ltd., who are machining graphite for Ayrshire's nuclear power station at Hunterston.

Powell Duffryn Engineering are described by the chairman of the group, Sir Henry Wilson Smith, in his recent annual report, as having completely reoriented this side of their business.

They have developed the fabrication of oil storage tanks and their erection, and the production of Dempster mobile material handling equipment.

The key question for Powell Duffryn Carbon Products is whether there is going to be continuity of work load for the machine shops at a time when there is a surplus of graphite machining capacity. Developing the company's other activities means renewed effort in the field of chemical industry equipment.

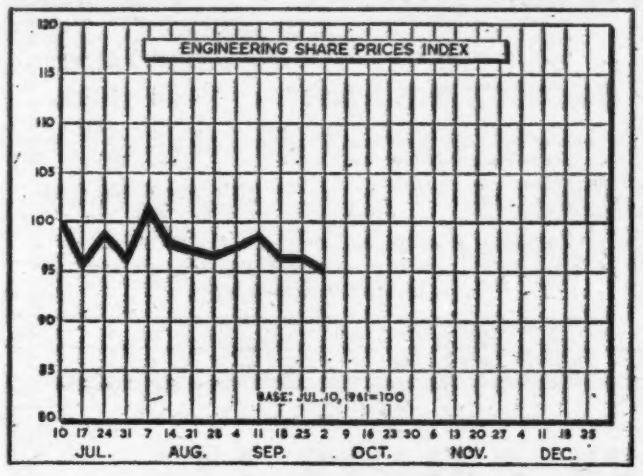
AEI make pre-charged batteries

TWO ranges of car batteries whose plates are charged and hermetically sealed at the factory are being produced at the Ponders End, Middlesex, works of Associated Electrical Industries Ltd.

The sealed, charged batteries are transported and stored dry and are ready for use soon after the acid has been poured in.

Standard and heavy-duty units in six and 12-volt sizes are available.

First appearance of the batteries will be at the Motor Show, Earls Court, London, which begins October 18.



ELECTRICAL ENGINEERS COMBINE PRODUCT LINES

Peebles-Belmos merger: shares exchange offer

TWO big Scottish electrical engineers propose to merge. They are Bruce Peebles, of Edinburgh, and Belmos, of Lanarkshire. Peebles produce transformers, rotating plant, and rectifiers. Belmos manufacture control gear and switchgear. The chairman of both companies, Mr. Thomas Coughtrie, says in a letter to shareholders that over the years a "friendly" relationship has been built up between both firms.

One of two high-pressure brake engines for the Doornfontein Gold Mining Company under test at the Erith Works of G.E.C. before being shipped to South Africa.

Hambros Bank, who made the share exchange offer on behalf of Peebles, say the terms are fair and reasonable. Recommendation has also been made by an independent firm of Glasgow chartered accountants.

One Bruce Peebles 6½ per cent cumulative preference £1 share has been offered for each Belmos 6 per cent cumulative preference £1 share, and 11 Bruce Peebles 10s. ordinary shares for every two Belmos ordinary £1 shares.

Group profits for Belmos were cut by the 1957-58 slow-down in the capital goods industries and a sharp fall in orders from the National Coal Board, to £54,000.

Recovery took place in 1959 and 1960 and before-tax profits this year are likely to reach at least £150,000.

Electrical industry faces market fight

SENIOR executives from A.E.I., G.E.C., English Electric, Crompton Parkinson and other companies are taking part today in the British Electrical and Allied Manufacturers' Association golden jubilee export conference in London.

U.K. EXPORTS

	1957	1960
Commonwealth Members	£164.5m	£168.0m
Common Market Countries	£ 27.6m	£ 34.1m
All Europe	£ 64.6m	£ 70.2m

Behind their speeches and discussion groups, ranging from engineering achievements in the electrical industry to market research and finance for export, stand the intractable problems of surplus capacity in parts of the industry, and the steadily increasing severity of international competition.

The electrical manufacturers, substantial contributors to the total of British export earnings, have not been able to equal in the last five years the rapid improvement brought off between 1950 and 1955.

From an export total of £160 million in 1950 the annual earnings from overseas sales had reached £245 million by 1955.

Last year it rose to £293.4 million, which although more than a tenth of all the manufactured goods exported, was only £8 million above 1959.

Electrical power plant, machinery and industrial equipment accounted for about a third of the industry's exports, and were worth £94 million.

The next main groups were electronics and telecommunications apparatus (£63 million), domestic appliances (£33 million), and cables (£23 million).

Whether or not to join the Common Market has a special significance for the electrical industry with 57 per cent of last year's exports going to the Commonwealth and 24 per cent to the whole of Europe.

AE BUYS UP FACTORY

DIESEL-ENGINE pistons will be the first products of the Wellworthy division of Associated Engineering to come from the 240,000 sq. ft. Bridgwater, Somerset, factory bought from Wilmot Breeden.

Associated Engineering, manufacturers of components for the aircraft and vehicle industries, acquired the Somerset works, which stand in 20 acres of ground, as part of its £12.5 million expansion programme.

Transfer of Wilmot Breeden's car-window fittings production to their chief Birmingham factories is already going on.

U.S. TAKE MORE U.K. BICYCLES

BRITISH bicycle makers have pushed up their exports to the U.S. by 50 per cent despite the falling level of U.S. bicycle imports.

Figures for the first six months of the year are: United States imports 1960—363,000 and in the first half of 1961—316,000, British exports were; 1960—93,000, and in first half of this year—138,000.

This lifts the U.K. share of the market from 25.5 to 43.5 per cent.

Exports to the U.S. from Belgium, the Netherlands, West Germany and Austria have all fallen swiftly over the past 12 months.

July's figures show the upward trend continuing. U.K. exports to the U.S. were 46,500 against 19,000 in the same month of 1960.

The majority of the models sold overseas are produced by Tube Investments' cycle companies.

ENGINEERING NEWS SHARE PRICES TABLE

1961 High	1961 Low	Stock	Oct 2	Ch'ge	Y'ld p.c.	1961 High	1961 Low	Stock	Oct. 2	Ch'ge	Y'ld p.c.
47/9	31/9	Allen, Edgar (£1)	32/9	+1/-	8.1	57/-	44/9	Lister, R.A. (£1)	49/9	...	5.5
43/-	28/6	Allen, W. H. (£1)	28/6	...	6.9	51/9	37/3	Mather & Platt (£1)	37/3	...	5.8
77/-	58/6	Angus, George (£1)	65/-	+1/3	6.1	67/-	49/-	Metal Industries (£1)	52/6	-9d.	5.6
31/10½	19/-	A.P.V. (10/)	28/9	...	3.9	71/3	53/4½	Morgan Crucible (£1)	60/3	+6d.	4.6
14/1½	8/10½	Asquith Machine Tool (5/)	10/1½	+7½d.	2.4	31/-	20/-	Morris, Herbert (10/)	23/-	-9d.	7.7
48/6	31/3	Assoc. Electrical Ind. (£1)	31/3	-3/9	9.7	52/-	39/6	Muirex (£1)	39/6	-1/6	6.3
16/5	11/8	Assoc. Engineering (5/)	12/0½	...	5.4	49/6	40/6	Neepsend Steel (5/)	44/6	-1/9	5.5
110/-	83/-	Averys (£1)	86/-	+1/-	3.4	31/6	21/9	Newton Chambers (5/)	25/-	+6d.	3.9
36/9	21/9	Babcock & Wilcox (£1)	21/9	-1/6	7.5	41/3	21/3	Parkinson Cowan (£1)	22/-	...	8.0
59/6	40/6	Baker Perkins (£1)	46/3	-6d.	4.8	72/9	47/-	Parsons, C. A. (£1)	48/6	-3d.	5.1
9/7½	5/10½d.	Beyer Peacock (5/)	6/4½	...	9.0	40/3	38/-	Plessey (10/)	38/-	-2/3	3.9
77/-	45/-	Birfield (£1)	63/6	-6d.	3.1	33/-	18/-	Pressed Steel (5/)	18/-	-1/3	8.2
102/10½	71/3	Birmid Industries (£1)	75/9	-1/6	5.2	25/3	18/6	Qualcast (5/)	20/6	...	4.4
36/10½	20/1½	Birmingham Small Arms (10/)	20/1½	-6d.	5.7	38/1½	24/-	Radiation (£1)	24/-	-4½d.	8.2
45/6	34/-	Brockhouse, James (£1)	36/-	-1/-	6.8	22/6	14/-	Ransome & Marles (5/)	16/6	...	4.1
28/9	22/2	Broom & Wade (5/)	27/9	-2/-	4.0	28/6	22/6	Ransomes, Sims & Jeffs (£1)	25/-	...	6.0
42/6	35/7½	Brotherhood, Peter (10/)	35/9	-6d.	7.1	50/6	34/6	Renold Chains (£1)	42/3	-9d.	4.6
48/9	33/-	Brown, John (£1)	34/9	-10½d.	6.2	52/3	38/6	Reyrolle, A. (£1)	38/6	-6d.	5.0
8/6	5/1½	Cammell Laird (5/)	5/1½	-6d.	...	9/1½	4/3	Richardsons Westgarth (10/)	4/4½	+1½d.	...
39/6	29/3	Carrier Engineering (5/)	32/3	...	3.8	9/3	5/3	Roberts, Charles (5/)	5/7½	+3d.	...
54/3	36/6	Clarke Chapman (£1)	38/3	-6d.	7.0	48/6	41/10½	Rolls-Royce (£1)	43/1½	-1/9	5.1
14/9	10/3	Cohen, George (5/)	10/3	-6d.	6.0	32/6	22/4½	Ruston & Hornsby (£1)	23/3	-3d.	7.5
33/10½	21/8	Coventry Gauge & Tool (10/)	31/1½	+9d.	3.9	19/3	14/9	Sarck (5/)	14/9	-3d.	4.2
12/3	8/-	Craven Brothers (5/)	8/1½	-4½d.	5.1	23/9	12/7½	Shaw, Francis (4/)	14/3	+7½d.	5.5
24/-	17/6	Crofts Engineers (5/)	19/3	+6d.	4.3	12/-	8/9	Sheepridge Engrg. (5/)	9/1½	...	7.9
117/6	129/6	Davy-Ashmore (£1)	38/3	...	3.5	32/4½	19/1½	Simms Motor (5/)	23/9	-3d.	3.5
70/-	51/-	De La Rue (10/)	51/6	+6d.	4.3	44/1½	29/7½	Sirtex Engineering (5/)	38/1½	+1½d.	3.5
27/7½	19/9	Delta Metal (5/)	21/9	...	4.5	23/9	14/3	Smith, S. & Sons (4/)	14/3	-3d.	5.5
68/9	50/-	Desoutter (5/)	55/-	...	3.0	15/3	12/-	Solar Industries (5/)	12/3	+1½d.	7.0
41/3	31/9	Dowty Group (10/)	34/1½	-3d.	4.5	45/7½	26/3	Staveley Industries (£1)	26/9	-3d.	8.1
32/10½	22/4½	Edwards High Vacuum (4/)	31/-	-9d.	1.9	32/6	18/6	Steel & Co. (5/)	29/1½	-10½d.	3.8
52/-	36/-	Elec. & Musical Ind. (10/)	36/-	-1/9	4.8	67/-	50/-	Stone-Platt Ind. (£1)	51/-	-1/-	6.2
38/-	25/9	Elliott-Automation (5/)	33/3	-3d.	1.9	20/4½	14/9	Tecalemit (5/)	16/9	...	5.3
40/6	27/6	English Electric (£1)	27/6	-6d.	7.2	17/4½	13/6	Thompson, John (5/)	13/9	...	1.7
37/3	28/6	Firth Cleveland (4/)	30/3	+3d.	4.2	7/-	4/9	Thornycroft, John (4/)	5/6	+6d.	...
39/6	26/3	G.E.C. (£1)	26/3	-6d.	7.7	17/6	11/6	Toledo Woodhead (4/)	14/10½	-1½d.	5.3
65/-	42/9	General Refractories (10/)	53/3	-6d.	4.6	85/6	61/7½	Tube Investments (£1)	59/9	-3/6	4.6
66/6	51/10½	Glenfield & Kennedy (£1)	51/10½	-3d.	8.0	38/4½	28/-	Vickers (£1)	29/6	-1/3	6.8
108/7½	78/6	Guest, Keen & Nettlefold (£1)	86/9	-1/6	3.6	157/6	122/6	Walmsley (Bury) (£1)	133/9	-3/9	3.3
48/7½	26/9	Haden, G. N. (5/)	27/-	+3d.	3.6	84/6	64/6	Ward, Thos. W. (£1)	70/-	+1/-	3.8
16/6	12/4½	Hall-Thermotank (5/)	12/7½	+3d.	4.3	17/9	12/9	Wiser, G & J. (5/)	13/1½	-6d.	6.6
24/-	15/6	Harland & Wolff (£1)	17/3	-6d.	5.7	47/6	33/-	Wellman Smith Owen (5/)	40/3	-1/3	3.0
33/3	28/1½	Hawker Siddeley (£1)	28/1½	-1/6	7.5	14/1½	10/3	West, Allen (5/-)	10/9	-4½d.	6.1
31/-	21/10½	Head Wrightson (5/)	21/10½	-1½d.	3.6	46/3	32/-	Westinghouse Brake (£1)	29/6	-9d.	7.4
79/9	51/6	Herbert, Alfred (£1)	65/4½	-7½d.	4.2	36/6	19/9	Wheesoe (5/)	20/3	-6d.	6.6
95/6	77/6	Hick Hargreaves (£1)	77/6	-1/3	5.1	17/-	12/-	Wilmot-Breeden (5/)	14/6	-3d.	3.8
138/9	101/3	Hopkinsons (£1)	121/3	...	4.5	30/-	20/-	Woodall-Duckham (5/)	21/3	-6d.	4.7
25/-	18/6	Howden, James (5/)	20/-	+9d.	6.1	64/9	44/6	Worthington-Simpson (10/)	50/-	...	4.9
33/9	23/-	International Combus (5/)	23/4½	+4½d.	6.3						

IRON AND STEEL

43/6	25/7½	Brown Bayley (10/)	34/9	...	4.5	42/-	27/7½	South Durham Steel (£1)	27/7½	+1½d.	8.5
81/3	53/1½	Colvilles (£1)	53/1½	-10½d.	6.0	47/8½d.	33/9	Steel Co. of Wales (£1)	33/9	+3d.	7.3
32/3	23/9	Consett Iron (£1)	23/9	-6d.	7.9	57/4½	40/10½	Stewarts & Lloyds (£1)	43/7½	...	6.8
43/7½	26/10½	Dorman Long (£1)	28/9	-3d.	6.9	68/7½	43/1½	John Summers (£1)	46/4½	-1½d.	6.4
55/1½	39/4½	Firth & Brown (£1)	40/3	+1/3	6.1	55/7½	38/-	United Steel Cos. (£1)	44/6	+1/-	5.5
49/10½	31/9	Lancashire Steel (£1)	32/7½	+10½d.	6.6	63/6	46/-	Whitehead Iron & Steel (£1)	47/-	...	6.2

The companies whose share prices are quoted in the Engineering table and which form the basis of the Index give a balanced and comprehensive study of the engineering industry. Prices quoted are those at the start of the week. Due adjustments for Rights and Scrip issues are made. The Index figure is calculated on a National Cash Register Company computer. Prices in the Iron and Steel sections are not included in the Index.

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High salaries are offered commensurate with ability and experience.

An excellent pension scheme and five-day week are in force and financial assistance will be given to those moving to London.

Write in confidence to the Wellman Crane and Machine Company Limited, Parnell House, Wilton Road, London, S.W.1, addressing your letter for the attention of Mr. J. H. Knight, with whom mutually convenient interviews will be arranged.

ASSISTANT PRODUCTION MANAGER required by company with world-wide connections. Candidates must have practical experience in modern production control methods and in work study. Age group 27-35. This is a post offering good prospects to the right person; it is expected that the successful candidate will be made responsible for the department after a short trial period. Applications in candidates' own handwriting giving full details of positions held, with duties and qualifications, age and salary required to: FACTORY MANAGER, LOVABLE BRASSIERE CO. LTD., FARINGDON AVENUE, HAROLD HILL, ROMFORD, ESSEX, the envelope to be marked CONFIDENTIAL.

PARKE, DAVIS & COMPANY
require
FACTORY MAINTENANCE ENGINEER

He should be 26-34 years of age, a qualified Engineer, H.N.C. with preferably A.M.I.Mech.E. Experience should include maintenance of manufacturing and Packaging machinery for the pharmaceutical, fine chemicals, food or allied industries.
Some planned maintenance experience would be an advantage.
The terms of employment with the Company are attractive, they include a 5-day, 37½-hour week, generous salary, pension and life assurance plan.
Please apply:
Personnel Manager
Parke, Davis & Company
Staines Road
Hounslow, Middlesex

CONTRACT ENGINEERS

Dewrance & Co. Ltd. have vacancies for Contract Engineers. Interesting and progressive positions covering electrical and mechanical pipe line valve control. Write, stating age, experience and salary required to the Staff Officer.
DEWRANCE & CO. LTD.
165 Great Queen Street
London, S.E.1

CANADA

PROJECT ENGINEER

With extensive (min. 7 years) recent experience in the design and layout of modern cold rolling mills for the production of steel (or aluminium) strip, capable of drawing up specifications for rolling mills and auxiliary equipment, assessing suitability of suppliers' proposals and conducting subsequent technical discussions on details to ensure that the equipment purchased is of the most up-to-date design and will satisfy the product requirements, also capable of co-ordinating and supervising a Mechanical Design Group in engineering the establishment of new rolling mill facilities and modernisation of existing equipment. Salary range — $850 to $950. Write, giving full details in first instance to Box G.337, c/o Streets, 110 Old Broad Street, E.C.2.

STONE WALLWORK LTD., OLDHAM
require
SENIOR DRAUGHTSMAN

experienced in Foundry Equipment and light and medium fabrications. Minimum qualifications O.N.C. (Mech. Eng.). Superannuation scheme, sickness benefit, sports and social club, canteen facilities.

Apply Personnel Officer, Stone Wallwork Ltd., Bleasby Street, Oldham.

THE GLACIER METAL CO. LTD.
Kirkstyle, Kilmarnock, Ayrshire
RESEARCH METALLURGIST

A Research METALLURGIST is required for the expanding Metallurgy Department of the Research and Development Organisation which is situated at Kilmarnock.
The Company, the largest manufacturers of Plain Bearings in Europe, subjects its processes and products to vigorous and continuing research and development.
The successful applicant will assist in research work on metallurgical processes, with particular reference to the manufacture and properties of alloy powders used in the production of sintered materials. He will discover and quantify the basic principles involved, and plan, design and execute his own experiments and make recommendations, as appropriate, for changes in existing production procedures and techniques.
The ideal candidate for this position will have a Degree in Metallurgy or Physics, and/or A.I.M. or A.Inst.P., and have had at least two years' experience of research work preferably in powder metallurgy.
The preferred age range is 23-30 years, and a starting salary up to £1,250 per annum is envisaged, depending upon age, qualifications and experience. There are excellent prospects for further advancement.
Applications containing brief reference to age qualifications and present salary should be sent to the Personnel Services Manager, quoting reference 3/RDO/15/143/ENG

DRAUGHTSMEN

required in S.E. London for interesting and varied work on Public Telephone Exchange and Radio Equipment Design. Workshop experience desirable. Good salaries and prospects.
Apply Staff Officer 736/22/ENG
Associated Electrical Industries Limited
Woolwich, S.E.18

ENGINEER

required with H.N.C. and experience of refrigeration, food processing, packaging machinery, etc. Age 28-35. Good salary and prospects. Sickness Benefit and Pension Schemes. Offices will be moving to Bracknell in Spring of 1962. Assistance with fares from Bracknell Area until date of move.
Apply with full details of age, education, qualifications, experience, etc., to:
Assistant Company Personnel Manager
MAC FISHERIES LTD.
10/12 Little Trinity Lane
London, E.C.4

ROAN ANTELOPE COPPER MINES LIMITED
NORTHERN RHODESIA

invites applications for the following positions:

SECTIONAL ENGINEER (MECHANICAL)

The successful applicant would be responsible for all engineering work in a particular section connected with large-scale copper mining operations, including power generation and distribution, mine shafts and haulages, ore treatment, smelting and other associated heavy engineering plant.

ENGINEERING ASSISTANT (MECHANICAL)

Duties will initially consist of assisting with planning engineering projects of a varied nature in connection with large-scale copper mining operations, including power generation and distribution, mine shafts and haulages, ore treatment, smelting and other associated heavy engineering plant.

The successful applicants will receive an attractive basic salary in accordance with their qualifications and experience. In addition there is a variable bonus which for the year ended June, 1961 was 36½% of basic salary.

Employees are required to join the Company's Pension and Life Assurance Scheme and contribute 5% of their basic earnings to which the Company adds another 5% plus ¼% for each completed year of service. There are also schemes covering Medical Benefits, Share Purchase and Home Ownership. An outward passage is provided and married accommodation is available on engagement at a sub-economic retnal.

Candidates, who should be under 35 years of age, should have a degree or equivalent qualification in Mechanical Engineering and experience in heavy engineering. Applications covering age, qualifications and experience, should be sent to:—

D. J. Beake, Selection Trust Limited
Mason's Avenue, Coleman Street, London, E.C.2
PLEASE QUOTE: 25D

BRITISH OXYGEN COMPANY LIMITED
CRICKLEWOOD

has three vacancies in their Research and Development Laboratories for

QUALIFIED METALLURGISTS

with a broad metallurgical background and preferably 1 to 2 years' work or laboratory experience, possibly in the steel industry. The successful candidates will be required to carry out metallurgical investigation concerned with welding, cutting, flame hardening and other operations involving the companies' products.

Applicants aged between 21 and 28, should write in detail to
Personnel Officer,
B.O.C. Ltd.,
North Circular Road,
Cricklewood, London, N.W.2.
Quote Ref: M.E.T.

MASSEY-FERGUSON

AGRICULTURIST

required to investigate and follow up the development of new methods in agriculture in relation to agricultural machinery. Degree in agriculture essential plus a knowledge of French and German and preferably 5 years experience in Agricultural Research.

PROJECT ENGINEER — General Design

for research and design of Agricultural Machinery. Degree in Mechanical and/or Agricultural Engineering required, with some practical experience of design work.

Attractive salaries will be paid for these pensionable posts, which will be based at Coventry.

Applications in writing and quoting ref. **EN 101/P1** to the:
PERSONNEL AND INDUSTRIAL RELATIONS MANAGER,
BANNER LANE, COVENTRY

DELANEY GALLAY LTD.

require

1. Qualified Metallurgist

for their Cricklewood Laboratories

The Company specialises in Metal Joining and this brings many diverse problems which require investigations. Ideally the successful applicant will have welding and brazing experience and will be in the 20/25 age group. Apply Personnel Manager.

2. Designer/Draughtsman

Must be experienced in design of pressed metal assemblies for quantity production, preferably in automobile industry. Knowledge of design in plastics should be an advantage. Apply Chief Designer, Automotive Division.

3. Draughtsman

for work on Aircraft and Industrial equipment. Apply Chief Designer.

4. Project and Development Engineer

for heat transfer problems, for projects covering all industries. No age limit. Previous experience an advantage, but not essential provided applicant has good mechanical and engineering background. Apply in writing, in confidence, giving full details to Chief Engineer.

DELANEY GALLAY LTD.
Vulcan Works, Edgware Road, Cricklewood, N.W.2
GLA 2201

...Scientists — Engineers — Graduates — Designers

THE BRITISH OXYGEN COMPANY LIMITED

invites applications from

ENGINEERS

for positions in their Plant Production Engineering Department. This department is engaged in the manufacture of oxygen and similar gas producing plants and storage vessels. The work which embraces the use of various ferrous and non-ferrous materials, consists of high quality welded fabrications, heat exchangers, pressure vessels pumps and compressors.

PRODUCTION ENGINEERS

To develop new and improved methods of manufacture, liaise with development department to ensure new designs are economical for production, settle day-to-day production problems, develop and improve for productions tools and equipment, assist and advise on workshop layouts.

WELDING ENGINEERS

to carry out the continual appraisal of the welding methods and techniques available and to adapt and develop such techniques as are required for the production programme, determine welding procedures and draw up welding specifications and standards and carry out a programme of operator training as required.

These positions carry attractive commencing salaries and offer excellent working conditions. Write, giving full details of career to date, to:—

Recruitment and Training Officer (NE/L1845)
THE BRITISH OXYGEN COMPANY LIMITED
Engineering Division **Angel Road, London, N.18**

THE GLACIER METAL COMPANY LIMITED

RESEARCH MANAGEMENT

—Is this your career? We offer you an opportunity to manage research projects. You will have subordinate graduates and technicians; you will allocate work to them, train them, review their salaries, etc. These jobs are an excellent stepping stone to research management. The vacancies are for:—

SENIOR RESEARCH ENGINEERS

Applications are invited from Engineers with 1st or 2nd class honours, an interest in the physics of engineering, preferably some research experience, age 27 or over. Starting salaries £1,500 upwards

Current field of work is plain bearings, with a wide variety of projects in hand including hydrodynamics, vibration, fatigue and structural analysis.

Applications should be sent to:

The Personnel Divisional Manager,
THE GLACIER METAL COMPANY LIMITED,
Alperton, Wembley, Middlesex.
(Ref SRE.)

HADEN

Applications are invited from qualified and experienced

DESIGN DRAUGHTSMEN
(H. & V.)

for one appointment in each of the Company's CANTERBURY and LINCOLN offices.

Preferred age range 23-30. Assistance given with removal expenses.

Full details, in confidence, to:
The Personnel Officer
G. N. Haden & Sons Ltd.
7/12 Tavistock Square
LONDON, W.C.1.

Transitron

TECHNICAL SALES ENGINEERS

This company, having successfully completed the initial phase of setting up a Sales Organisation to market the products of its American parent company in the United Kingdom, has now reached the stage where a further expansion is required and vacancies for Sales Engineers exist in the Home Counties and Midlands areas.

This is an excellent opportunity for Engineers who are interested in a Sales career that will keep them in the forefront of the latest developments of the electronic industry.

Applicants should have H.N.C., minimum—experience of selling in the Electronic Component Industry and a knowledge of the market in the areas envisaged would be considered a distinct advantage.

Please apply, giving brief details of qualifications and experience together with required salary, to:—

TRANSITRON ELECTRONIC LTD.
Bilton House
Uxbridge Road, London, W.5

ELECTRICAL DESIGN ENGINEER

The Harland Engineering Co Ltd., Alloa, has a vacancy for an Electrical Design Engineer with 3 to 4 years experience in the design of A.C. or D.C. machines. The work is varied and interesting. Applicants should have a good H.N.C. or Degree in Electrical Engineering. **Full details of experience and Technical qualifications to Personnel Manager.**

Of Interest to Applied Physicists and Engineers

B Nylon S

Nylon production involves some of the more interesting aspects of engineering, the range of which comparatively few engineers appreciate.

The work covers a very wide field of light engineering which incorporates feed-back mechanisms, heat transfer, torsional vibration and analogue simulations involving various combinations of mechanical, electronic, electrical, transistor, optical and magnetic devices.

We need men between the ages of 21 and 33 years, who welcome a challenge and meet it with original thought and ingenuity. We have found that the necessary qualifications are good honours degrees in either Applied Physics, Mechanical or Electronic Engineering or Professional qualifications backed up by relevant experience. A knowledge of Chemical Engineering would be an advantage.

British Nylon Spinners Limited has a highly qualified team of Experimental Engineers who design specialised production machinery and produce intricate apparatus for pure and applied research. Each Experimental Engineer is responsible for the design, experimentation and development of his various projects, many of which may require special techniques.

The Company pursues an active policy of filling more senior appointments from within. All members of the staff are encouraged to take up posts in other parts of the organisation in order to develop their full potential.

We are in most attractive countryside within easy reach of towns. Rented housing is available at reasonably short notice for which married men moving into the area obtain priority. Profit sharing and contributory pension schemes operate. Assistance is given with removal expenses. Applications, quoting E.160, should be addressed to The Personnel Manager,

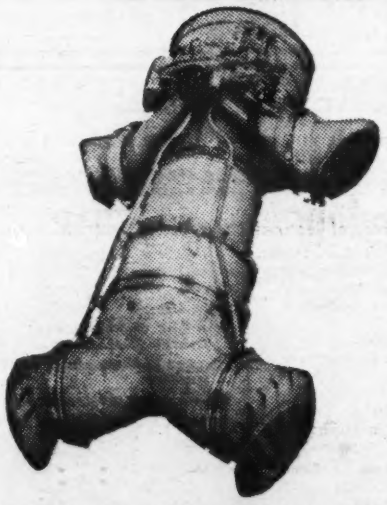
British Nylon Spinners Limited
PONTYPOOL · MONMOUTHSHIRE

REFRIGERATION

Expanding organisation requires Senior and Junior Technical Sales Engineers with H.N.C. equivalent or better for wide variety of applications employing industrial size plant. Please send full details marked confidential to Industrial Manager, York Shipley Ltd., North Circular Road, London, N.W.2.

BRISTOL SIDDELEY ENGINES LIMITED

MECHANICAL ENGINEERS



The Pegagus engine as fitted to the Hawker P1127 aircraft.

The Company is one of the few large aero-engine manufacturing organisations in the world and is recognised as being in the forefront of the aero-engine design and development fields. It is further expanding its activities and, as a result, Mechanical Engineers are required to carry out research and development on a wide range of gas turbines and ramjets.

Although these engines are designed to fulfil a specialised role, the work required to produce them covers an extremely wide field, so that there is immense scope for the engineers, aerodynamicists and technologists employed.

The mechanical engineers' function is to translate the original concept of an engine into a mechanically reliable machine capable of meeting the arduous mechanical and performance requirements imposed on it. This is achieved by the intensive use of experimental engines and research rigs, where the development of the engines and their individual components is controlled by the mechanical engineers.

The qualifications required are a degree, Higher National Certificate or equivalent; and experience of this type of work is desirable but not essential. Good salaries, commensurate with experience and qualifications, are paid, and allowance can be paid for moving.

Fill in this coupon in BLOCK CAPITALS and address it to:—
H. J. Thompson, Personnel Manager, Bristol Siddeley Engines Limited, PO Box 3, Filton, Bristol.

We will send you an application form and, if you are suitable, we will arrange an interview.

NAME _____

ADDRESS _____

_____ 72/61/EN

PA PERSONNEL ADMINISTRATION LIMITED

MANAGEMENT CONSULTANTS

WORKS MANAGER Heavy Engineering

A British Company of international repute manufacturing large Heat Exchangers, Air Preheaters, Precipitators and Fans, is undergoing a period of rapid development. A vigorous and well-qualified Works Manager is required to lead this development in a factory employing 1,000 men. He is needed equally on the shop floor where the emphasis is on heavy fabrication and machining, and in the office where organisational and imaginative qualities are required. A record of success in Production and Man Management, and experience of heavy engineering, is essential. A graduate age 35-45 will be preferred. Starting salary up to £3,000 with substantial benefits and prospects. (Ref. W7/698/EN)

WORKS MANAGER Engineering

for a long-established, medium-sized, heavy engineering company in the Midlands. The company is in the process of modernisation and diversification and the Managing Director is anxious to find a well-qualified and experienced mechanical engineer who can assume full responsibility for the works. Candidates, aged 30-45, must be skilled in modern machine tools and fabrication techniques, keenly interested in methods and able to carry through a diverse manufacturing programme, with a labour force of about 350. A salary in the region of £2,000 p.a. will be paid. There are good prospects both of a Board appointment and of wider group responsibilities. Usual benefits. (Ref. W5/694/EN)

PRODUCTION MANAGERS AND ENGINEERS

An organisation prominent in British industry and working also on the continent of Europe, in North America and in Australia, seeks a small and extremely select number of men aged 28 to 33 years who are university graduates and have already had 4-5 years in production management. A progressively broadening future towards general management is offered. Starting salary will be up to £2,200 per annum and £4,500 can be quickly reached thereafter. (Ref 788/TLG/EN)

The identities of candidates will not be revealed to our clients without prior permission. Applicants should forward brief details, quoting the reference number, to:—

Personnel Administration Limited, Appointments Division, 2 Albert Gate, London, S.W.1.

Regional Offices: GLASGOW . MANCHESTER . BRISTOL
BIRMINGHAM . DUBLIN . LEEDS
PARIS . DUSSELDORF

ENGINEERING SERVICES APPEAR ON PAGE 27

LUCAS

Manufacturers of Automobile, Aircraft and Industrial Equipment.

BURNLEY GROUP OF FACTORIES
RESEARCH LABORATORIES

Engaged on work concerned with combustion problems in aircraft and industrial gas turbines, refrigeration, air conditioning and similar projects, with their associated control systems require:

DEVELOPMENT ENGINEERS

to organise and carry out test programmes on the projects outlined above

Candidates should hold a degree in Mechanical Engineering or alternatively the Higher National Certificate with a good experience in experimental and development work.

DESIGNERS

preferably with a degree, or Higher National Certificate, coupled with several years' experience. A knowledge of Heat Transfer, Refrigeration or Design Stressing would be an advantage.

STRESS ENGINEERS

are required for work on a variety of projects involving pressure vessels, combustion chambers, bellows, heat exchangers and honeycomb constructions.

Applicants should be graduate engineers, physicists or mathematicians who have an interest in, or experience of stress and stability problem analysis.

Written application, giving details of qualifications and experience, should be addressed to:

The Personnel Manager
LUCAS GAS TURBINE EQUIPMENT LIMITED
Hargher Clough Works, Hargher Street, Burnley, Lancashire

CANADA

PROJECT ENGINEER

Large Canadian Industrial Organisation requires Project Engineer with extensive (**min.** 7 years) recent experience in the design and layout of modern cold rolling mills for the production of steel (or aluminium) strip, capable of drawing up specifications for rolling mills and auxiliary equipment, assessing suitability of suppliers' proposals and conducting subsequent technical discussions on details to ensure that the equipment purchased is of the most up-to-date design and will satisfy the product requirements, also capable of co-ordinating and supervising a Mechanical Design Group in engineering the establishment of new rolling mill facilities and modernisation of existing equipment. Salary range $850-$950 per month. Excellent prospects. Assisted passage. **Write giving full details in first instance to Box G337, c/o Streets, 110 Old Broad St., E.C.2.**

SENIOR DRAUGHTSMAN

required

with suitable experience for work on either A B, C below:

A **Reciprocating Compressors**
B **Rotary Compressors and sans**
C **Plant layout and pipe arrangement**

Involving large diesel or electrically driven compressors and boosters.

Applicants for posts A and B should have sound design experience on equipment having similar design consideration to the above.

Salary offered depends on experience and technical qualifications. This is progressive and interesting work on important projects. Facilities include canteen, superannuation, etc.

Applications in writing (which will be treated in confidence) to be addressed to: **The Chief Design Engineer, THE BRYAN DONKIN CO. LTD., Chesterfield, Derbyshire.**

Make certain you get your own

ENGINEERING NEWS

every Thursday by completing the coupon on Page 27 TODAY

Due to expansion
BOWTHORPE HOLDINGS LIMITED
Gatwick Road, Crawley, Sussex
offer the following vacancy

TEST ENGINEER
on Telectrical Work

Good prospects. Ideal working conditions. Salary in accordance with age and qualifications. **Apply in writing giving details to: Mrs. B. Whitaker.**

WORK STUDY
FERODO LIMITED

require a

Work Study Engineer

with at least five years' experience in Work Measurement. A good salary will be paid in accordance with age and ability.

Applications, giving full details of age, education and experience, should be addressed to the :

Personnel Manager
FERODO LIMITED
CHAPEL-EN-LE-FRITH, VIA STOCKPORT

LONDON COUNTY COUNCIL

HEATING AND VENTILATING ENGINEERS

Vacancies for engineers to work on the design of l.p.h.w. steam heating and ventilating schemes. The work is interesting and varied and provides many opportunities to gain worthwhile experience on major projects. Good prospects for keen, adaptable men with corporate membership of the I.H.V.E. or with some experience of this work and prepared to qualify. Salaries in the entry grade up to £1,500.

Application form and full details from the Chief Engineer (GS/E/2785/10), County Hall, London, S.E.1.

ENGINEERING OPPORTUNITIES IN MECHANICAL DESIGN

A design programme which continues to expand rapidly enables the BRITISH MANUFACTURE AND RESEARCH CO. LTD. to offer further Senior and Junior posts.

Whether you are interested in military or civil projects we have vacancies to attract designers and supporting detailers with sound experience of:

JIG and TOOL, or PRESS TOOL or SPECIAL PURPOSE MACHINERY DESIGN
(keen to apply such experience to Automated Industrial Processes).

PRECISION ENGINEERING DESIGN
in the light/medium range with emphasis on electro-mechanical mechanisms, gearing, fabricated structures and light alloy castings (for Weapon systems — **not** G.W.)

The Company, a member of the Hispano Suiza Group, offers above-average salaries plus payment for overtime. Canteen, sports facilities, pension scheme and sick fund are available.

Applications, stating qualifications, experience and present salary should be addressed to:

The Chief Engineer,
BRITISH MANUFACTURE AND RESEARCH COMPANY LIMITED,
Grantham, Lincs., quoting ref: SA/EN.

MASSEY-FERGUSON
COVENTRY

Experimental Engineering Department have vacancies for

DRAUGHTSMEN

For layout design and detailing of agricultural tractors and machinery.

O.N.C. minimum qualification.

Superannuation and Life Assurance Schemes: canteen and transport facilities available.

Applications, quoting ref. **IEN 80/P1** to the:

PERSONNEL AND INDUSTRIAL RELATIONS MANAGER,
BANNER LANE, COVENTRY

SOUTHERN INSTRUMENTS LIMITED
require the following:

ENGINEERS, TECHNICIANS and REPRESENTATIVES

to fill appointments in their subsidiary companies based at their main works in Camberley

Ansafone Limited — Britain's largest manufacturers of automatic telephone answering and recording systems—are expanding their National Sales Force. Applications are invited from Speciality Salesmen already earning four-figure incomes, preferably in the business equipment or private telephone fields. Remuneration by salary, commission and expenses with unusually good prospects of a first-class career in a rapidly expanding industry.

Southern Analytical Limited. An expanding company specialising in instrumentation for chemical analysis and quality control require a trainee technical sales representative. Laboratory and field training will be given in all products. Home and overseas travel essential. Applications must be from qualified chemists, preferably with some analytical experience.

The Instrumentation Division require a Senior Technical Representative to work initially from his home in the Birmingham Area but eventually to set up a branch office. A good electronics background and wide engineering application experience essential. Applicants should have had experience in the fields of instrumentation or data handling equipment. A four-figure salary is envisaged depending on experience. A generous car allowance, alternatively a car will be provided.

Southern Communications Limited require
1) Electro-Mechanical Development Engineer, minimum qualification H.N.C. with knowledge of electro circuitry mechanisms. Drawing Office experience essential.
2) Electronic Engineer with degree or equivalent and three to four years experience.
3) Laboratory Assistant or Junior Engineer to assist with development of V.H.F. Radio Telephone equipment. Minimum qualifications O.N.C. or City and Guilds Telecommunications.

Storno-Southern Limited require Field Service Engineers for planning, installing and commissioning Mobile radio telephone systems. Men with previous experience preferred.

Applications in the first instance to:

The Personnel Officer
SOUTHERN INSTRUMENTS LIMITED
Frimley Road, Camberley, Surrey

W. S. ATKINS & PARTNERS

Consulting Engineers

REQUIRE

DRAUGHTSMEN

For the design office of their Plant Department

Applicants should be between 20 and 25 years of age, have a good knowledge of Plant layout and piped services, and hold the O.N.C. (Mechanical).

Permanent progressive posts are offered with Pension Scheme, five-day week and Luncheon Vouchers.

The work is based in London (later in Epsom) with occasional visits to sites. Please reply to the :—

Personnel Manager
158 Victoria Street
London, S.W.1

Wall's ICE CREAM

DESIGNER—DRAUGHTSMAN

(Reference 368)

Designer-Draughtsman required at our Acton Factory preferably with experience of plant layout in connection with the food industry; knowledge of refrigeration and mechanical handling would be an advantage. Preference will be given to men with O.N.C. or higher qualifications.

Salary in accordance with age and experience. Five-day, 37½-hour week.

PLANNING ENGINEER

(Reference 369)

Man around 30 years of age with an engineering degree is required to take charge of the planning section of the engineering department at our Acton works. He must be capable of dealing with all aspects of engineering planning on the site and, although the work is primarily mechanical, it does include some electrical and building planning.

He will be required to devise systems for maintenance and new project control. There are good prospects of promotion for the applicant with potential who performs the job satisfactorily.

INSTRUMENT TECHNICIANS

(Reference 370)

Training for Promotion

We require to train Technicians to install and service the complex control systems at our new factory in Gloucester, and we are prepared to train in our factories suitable candidates whose academic qualifications are up to H.N.C. standard in mechanical or electrical engineering or any other associated skill.

The kind of men we are looking for may be at present engaged as high-grade craftsmen in the mechanical, electrical or radio industries and the jobs for which they will be trained are monthly paid salaried positions. Salaries while training are a matter of private negotiation between individuals, but we don't expect anyone to lose money by coming to us.

We are not prepared to offer successful candidates financial assistance to move into the Gloucester area.

Applications in writing to Company Personnel Manager, T. Wall & Sons (Ice Cream) Ltd., Walls House, Olympic Way, Wembley, Middlesex.

TUITION

UNIVERSITY OF SHEFFIELD

Postgraduate Department of Applied Mechanics

SHORT COURSES FOR PRACTISING ENGINEERS

The following courses of lectures and practical instruction will be held during the 1961-62 Session.

- Electronics for Engineers
- Analogue Computing Methods for Engineers
- Mechanical Vibration
- Analysis of Failures of Machines and Structures
- Corrosion and Fatigue
- Stress Determination
- Fine Measurement in Mechanical Engineering
- Noise
- Gear Design
- Hydraulic Operation and Control of Machines
- Servomechanisms and Automatic Controls
- Gear Loading, Stress and Life
- Friction, Wear and Lubrication
- Plasticity

Further details and forms of application for admission may be obtained from:— **W. A. Tuplin, D.Sc., M.I.Mech.E., Professor of Applied Mechanics, The University, Mappin Street, Sheffield, 1.**

Engineering News

MACHINERY FOR SALE

WM. WATTS LTD.

CANAL STREET, NOTTINGHAM
NOTTM. 55502

offer the following new machines ex stock :

"UNION" 4" dia Traversing Spindle and Facing Head ...	£10,043
"ZERRST" 28" SS & SC. 13' b.c. 43" swing over saddle	£7,797
"PEARSON" 120 ton x 10' Hyd. Press Brake	£4,420
"APRESTA" Guillotine ¼" x 10'	£6,669
½" x 10'	£3,051
"SAAFELD" Hyd. Cold Saws — 7" cap	£2,063
11" cap	£2,396
"MIKROMAT" 10" x 40" Hyd. Horz. Spindle Grinder	£2,812
"RUHLA" Universal Die Sinking and Tool Miller 33" x 12½"	£2,128
"HECKERT" Long Thread Miller 8" x 20"	£2,100

FULL DETAILS ON REQUEST

SPECIAL SELECTIONS FROM OUR EXTENSIVE STOCKS OF MACHINE TOOLS

RHODES No. 2 Double Sided Upright Rigid Geared Power Press. 45 strokes per min., 3" stroke, bed area 26" x 30". Standard hole in bed 16" x 16", max. bed to ram 19"/3 with 3" adjustment. Udall guards. Motorised 415/3/50. Weight 9 tons.

RHODES Super Dicing Press. Inclinable, 45 tons, adjustable stroke ¼" to 2¼" Bolster 23" x 21". Infinitely variable strokes per min. from 50-400 r.p.m. Variable speed motor 20 h.p. 8" wide roll feed and scrap shear. Motorised 415/3/50. Weight 5½ tons.

Both these machines are in first-class condition

We invite your inquiries for all types of machine tools. Extensive range of machines ex stock.

J. LAWRENCE & CO. (MACHINE TOOLS) LTD.
Telephone: GLAdstone 0033
Telegrams: Telex, Rockmac, London 22781

FOR SALE
Two 255-ton
CRAIG & DONALD 8/35 DOUBLE-SIDED GEARED PRESSES
One with Air Cushion, 1 without.
Stroke 12in. Between uprights 35in.
Air Cushion travel 6½in.
Motor drive 400/440/3/50.
Photograph available
F. J. EDWARDS LIMITED
359 Euston Road, London, N.W.1
EUSton 5000
41 Water Street, Birmingham 3
CENtral 7606

HELIOT
CAPSTAN LATHES

Ward 7. 2¼-inch capacity covered bed, Collet head and bar feed.
Ward 2A. 1¼-inch capacity Collet head.

TURRET LATHES

Ward No. 16. Covered bed, 8½-inch spindle, 32-inch 4-jaw chuck, rapid and power feeds to saddle, across line and turret, power rotating turret, spindle speeds 7/225 r.p.m., 50/h.p. motor.
Ward No. 10B. Covered bed, 4½-inch spindle, power rotating turret, power and rapid feeds to turret only. Collet head and bar feed.

35 Greenwich Church Street
London, S.E.10
Greenwich 1222

HURÉ UNIVERSAL MILLING MACHINES

Table size from 40in. x 10½in. to 110in. x 27½in.

All models suitable for heavy production milling, or sensitive toolroom milling.

Sole Agents for British Isles:
SOUTHERN ENGINEERING & MACHINERY CO.
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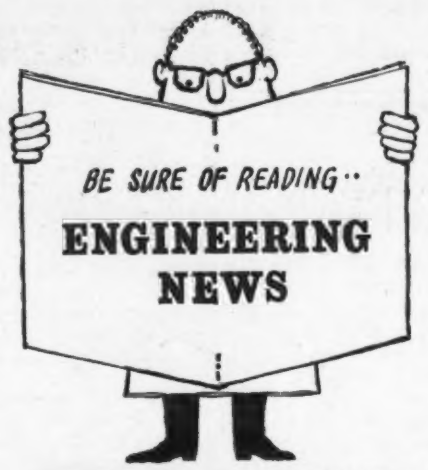

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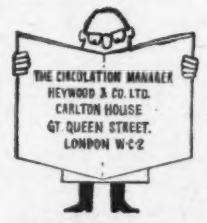

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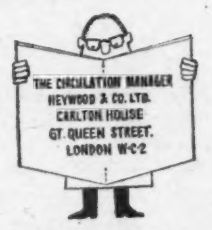

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CZECHS PATENT CONDUCTOR ALLOY

AN aluminium alloy with the electrical conductivity of pure aluminium and the mechanical properties of copper is the subject of a new Czechoslovak patent, No. 86,889.

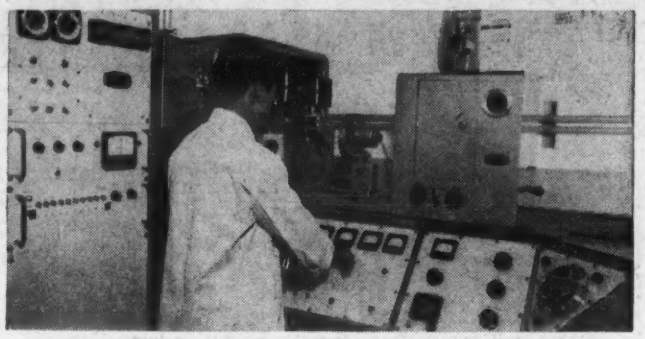
Jareal, as it is called, contains 0.3 to 0.5 per cent silicon, 0.05 to 0.15 per cent zinc and 0.2 to 0.4 per cent iron, while the permissible content of impurities is 0.1 per cent copper, 0.05 per cent manganese, 0.05 per cent nickel, and 0.1 per cent of other impurities.

The alloy has given good results when used for trolley lines, bare wires with corrosion resistance, and windings for stationary and rotating machines, as well as for insulated wires and cables.

Japanese cut cost of thermoelement production

NEW 'FRIDGE IN TWO YEARS

First commercial rival to conventional compressor systems



Precision testing equipment being used at the Sanyo Electric Co. of Osaka.

REVOLUTIONARY developments in thermoelectric cooling bring direct competition to conventional systems for the first time. The Sanyo Electric Co., of Osaka, Japan, are already producing a range of speciality equipment.

The company's engineers confidently predict that thermoelectric consumer appliances will be feasible within two years.

The new technique evolved by Sanyo eliminates the high cost and brittle nature of the bismuth telluride alloys used in production of the thermoelements.

Component materials are used in powder form and alloyed by sintering process, these are repowdered and again sintered.

Thermoelements are concave in shape, reducing the amount of alloy used and providing a large area of contact for efficient flow of heat and current.

Three component alloys are at present employed. Quality of this material is slightly lower than alloys obtained by zone processes, but the small sacrifice in figure of merit is justified by the substantial saving in cost.

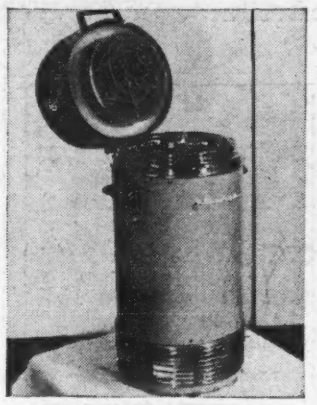
Equal efficiency

Thermocouples constructed from these alloys are capable of sustaining temperature differences of 80°C, and yield efficiencies comparable with compressor systems. Cooling is economic for loads up to 150 B.Th.U. per hour.

This method of cooling arises from a phenomena known as the Peltier effect.

When direct current is passed across the junction of two dissimilar conductors, heat is emitted or absorbed according to the direction of the current.

Until recently, metallic conductors have been employed to form a junction. The resulting cooling effect of this method has been too small for practical application.



Thermoelectric cooling jar.

Mr. H. Burke urges new-look economy

THE Institution of Production Engineers must play a leading part in directing the attention of the Government to what appears to be the weaknesses in their policy.

This was the theme of a personal letter sent to all members this week by the President of the institution, Mr. Harold Burke.

The institution must also direct the attention of the members to what they can do in dealing with the daily problems of their business.

What can we as an institution, he asks, do about the present economic position of the country and what are you going to do as a member of the institution?

He goes on to make a number of constructive suggestions for members to consider, including:

How far can you improve on this in your own administration?

Do you regularly examine costs and methods of manufacture?

Do you find time to keep yourself up-to-date in modern trends?

Do you use all the means within your power to spread knowledge of Production Engineering?

He ends with an appeal to all members to make their own personal contribution towards the improvement of our National Productivity.

● continued from p.1

FERRANTI DRILL

right-angles to the front of the machine by two hydraulic jacks.

Accurate positioning of hole centres is carried out in two stages. Firstly, rough positioning is achieved by the use of a perforated template attached to the drilling table and a light beam operates a photo-electric cell to control the machine.

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A positional accuracy of ± .001in. and repeatability to within .001in. can be obtained.

Drilling is carried out to a grid system, the holes being drilled in a systematic pattern of rows and columns. Basic spacing between rows is determined by the thread pitch of the rack.

LATE NEWS

Western Germany is now the second market for the British machine tool industry. The Machine Tool Trades Association, reporting a 35 per cent increase in new export orders for machine tools in July, says that Western Germany has now gone in front of Australia as a market for British tools.

TEN-YEAR RUST TEST

VOLATILE corrosion inhibitors proved as effective as petrolatum type corrosion preventives in protecting steel from rust during a ten-year storage period according to the U.S. Department of Commerce.

Two volatile corrosion inhibitors were evaluated in the study, one of which comprised ½ gm sodium nitrite and ½ gm urea loaded at the rate of 1 gm sq. ft. of paper in which the components were wrapped.

No degreasing was required after removal of the material from storage.

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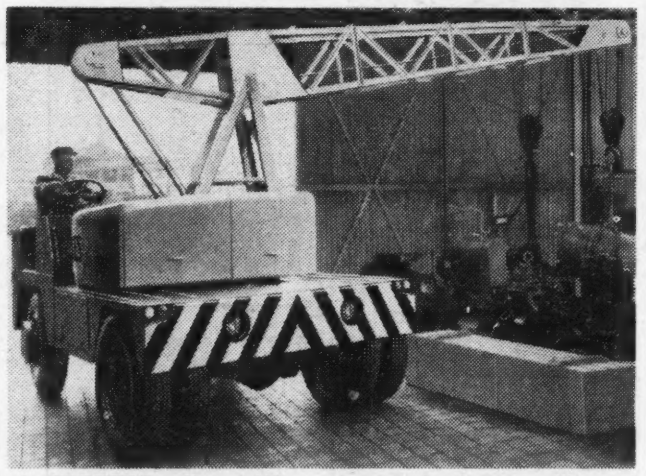
COMPACT CRANE FOR CONFINED SPACES



A TURNING radius of 12ft.—less than a London taxi—and a tail radius exceeding the chassis width by only 1in. are two of the features which make the new Coles Leda mobile crane, manufactured by Steels Engineering Products Ltd., Sunderland, particularly valuable for work in confined spaces and in narrow aisles.

Maximum speed is 17.6 m.p.h., the power unit being a Ford diesel engine of 3.61 litres. The crane can negotiate a gradient of up to 1 in 3¼ and the same engine is used for both travelling and lifting, the generator being driven from a gearbox power take-off.

The generator is a normal variable voltage/variable speed unit but is underslung from the crane chassis. Slew unit, brake and motor are also mounted in this fashion, the superstructure bearing only the hoist and derrick units, motors and brakes.

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